AIR pictorial

NOVEMBER 1980 55p

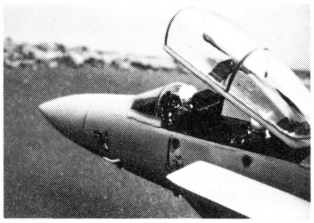
Stratofortress Sortie

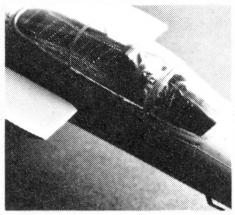
German PR in World War II

Is it real?...

No, it's an Airfix F-15 Eagle, made up "straight from the box" and photographed against a printed backdrop. The photographs are un-retouched, a tribute to the accuracy and realism of this superb kit of this air superiority fighter.

The Airfix F-15 Eagle is a 1/72nd scale Series 5 Kit that will enable you to model either the F-15A single-seater, or the F-15B two-seater. Both variants feature fully detailed cockpit interiors

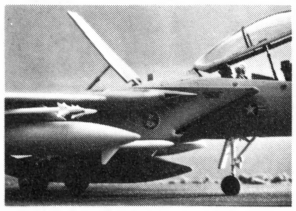


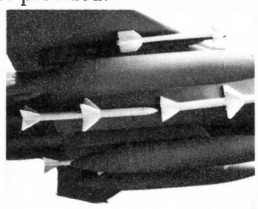


with opening canopy and the characteristic airbrake.

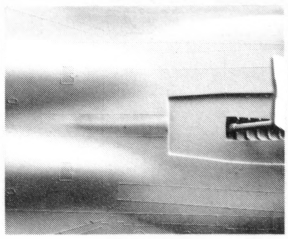
A full complement of guided weapons is made up of four AIM - 7F Sparrow missiles and four Super Sidewinders.

Three long range drop tanks are also provided.



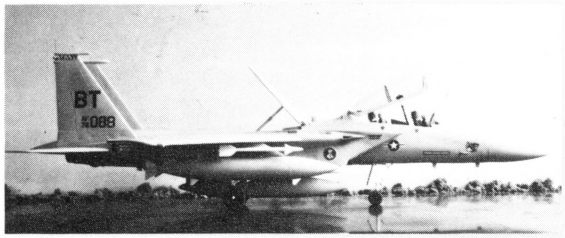


You will have to look hard to see the surface detail and panel lines on this model, they are of course accurate, but even on the full sized machine the skin is kept as smooth as possible. and there are no obvious clumsy looking panel joints.



The Airfix F-15 Eagle is one of the most exciting modern jets — faithfully and accurately reproduced in kit form as only Airfix know how.

For full detailing information on the F-15 see the article in the April issue of Airfix Magazine — available from all good newsagents and model shops price 45p.



It's easy to reach Mach 2.2 . . .
. . . when it's an Airfix F-15

AIRFIX

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COVER: Two SAAB JA 37 Viggen fighters of the Swedish Air Force's F 13 Wing, based at Norrköping. Their armament includes British Aeropsace Sky Flash all-weather missiles (Photo: A. Anderson)

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AIR pictorial

British Light Aircraft

HOW OFTEN does one hear a yearning in British aviation circles for a revived British light aircraft industry, or at least just one or two suitable light types in current production that one can go out and buy with £ sterling instead of dollars? It never seems to end and while one is constantly reminded of the good old pre-war days when de Havilland ruled a large part of the light aircraft world, it does seem strange that Britain, alone of all the world's great aircraft manufacturers, has for many years had little to offer in the way of light aircraft—the British Aerospace (ex-Scottish Aviation, ex-Beagle) Bulldog or Pup being about the only notable exception.

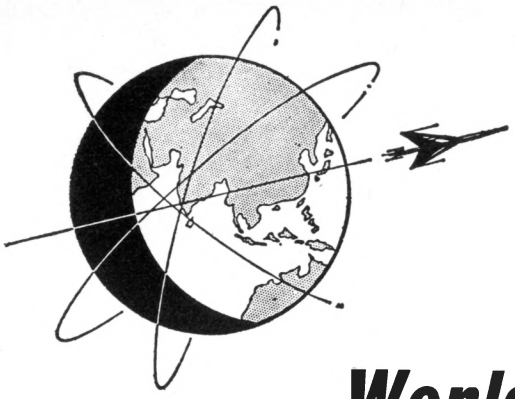
There are undoubtedly good reasons for this lack, but perhaps the main one is that we have allowed ourselves to slip. And having slipped, it is an awesome task to start again with a product that would have to compete with the Cessnas and Pipers which are produced in thousands. Any new British type should therefore be rather different from those already well established in the vast U.S. catalogues. In what way different we are not qualified to say, for it is a fact of life that those who make a success of a venture have usually thought of some aspect which others have not.

One must admit that the British private flier has a tough time these days, not only due to rising costs but, probably more to the point, due to a lack of sympathy from the Government, airport authorities and other bodies who almost seem to wish to discourage light aviation in this country. One could also add the extremists among the anti-noise people, although what could be nicer than the sound of a light aircraft putt-putting around on a warm summer's afternoon? How the U.K. private pilot must envy his American colleague who can land at virtually any U.S. airport, no matter how large or busy with airliners, or his French confrère who can collect subsidies from his Government for forming a group, a club, building his own plane, or similar activities related to light aviation! The French Government believes in aviation at grass-roots level, feeling that this is one of the ways in which the French nation can be encouraged to become air-minded and France made strong in the air. It is no accident, too, that France has risen from her W.W.II shambles to become the second largest light aircraft producer in the world, after the U.S.A.

Now we have a new hope on the British light aircraft horizon. Turn over this page and you will see a picture and preliminary details of the Brookfield BA1. Designed by Alan Greenhalgh, it is the winner of the Royal Aeronautical Society's light aeroplane design competition. The BA1 is certainly "different": its unorthodox layout seems to have been arrived at for perfectly practical reasons, and it will not therefore be in direct competition with all the other types now flying. As a bonus it has a ducted fan, and that should quieten the noise-objectors.

The R.Ae.S. is to be congratulated on holding the competition—"to encourage a resurgence in light aircraft manufacture in Britain"—but will not be involved in actual manufacture. That is Mr. Greenhalgh's job and we wish him all possible luck in attracting support to get the BA1 into production.

There is a hopeful precedent and while paying tribute to the Society, we recall the competition held by the Royal Aero Club in 1953. Winner that time was Henry Millicer in Australia with his Airtourer. After flying a wooden prototype in 1959, he got Victa Ltd.—who make two-stroke engines and lawnmowers—to put an all-metal version of the Airtourer into production. Later production was transferred to New Zealand where developed versions, including the military Airtrainer, were built by New Zealand Aerospace Industries. Today, apart from the civil Airtourers still flying, there are many Airtrainers giving Australian, New Zealand and Thai military pilots their first taste of flying.



Model of the Brookfield BA1 two-seat light aircraft powered by a 130-h.p. Rolls-Royce/Continental O-240A driving a ducted fan

World Air News

Lightplane design winner

WINNER OF the £2,000 prize in the Royal Aeronautical Society's light aeroplane design competition is Mr. A. J. Greenhalgh, C.Eng., F.R.Ae.S., with his Brookfield BA1. The aim of the competition, which attracted more than forty entries from countries as far apart as Australia and Norway, was to encourage a revival of interest in light aeroplane technology, design and manufacture in Britain. Details and drawings of ten of the most promising entries (including the BA1) were revealed at an intermediate stage and published in our December 1979 issue.

The Brookfield BA1 is of all-metal construction, with a high wing, V-tail, tricycle undercarriage and 130-h.p. Rolls-Royce/Continental O-240A pusher engine driving a Dowty-Rotol three-bladed plastic fan in a duct. The latter feature promises quietness both for the crew and externally. Comfortable accommodation is provided for two seated side-by-side, with excellent visibility and low access door height. It is envisaged that the design could be easily stretched to seat four.

Dimensions of the BA1 are 30 ft. span, 22 ft. 2 in. length and 7 ft. height. Weight empty is 927 lb. and gross weight 1,492 lb. Anticipated performance figures include 166 m.p.h. maximum speed, 155 m.p.h. cruise, 50 m.p.h. stall, 1,320 ft./min. initial climb rate, 25,000 ft. service ceiling, and 628 miles range; take-off and landing distances (to clear 50 ft.) are 930 ft. and 870 ft. respectively.

Mr. Greenhalgh joined A. V. Roe & Co. at Manchester as an apprentice in 1941, becoming Deputy Chief of Projects (1956–61), and later worked for Beagle Aircraft (1961–67) as Chief Project Engineer and Chief Designer. Since 1978 he has been employed by W. Vinten of Bury St. Edmunds as Chief Aeronautical Engineer.

New Sea Kings for R.N.

The Royal Navy took delivery of its first two Westland Sea King HAS.5 anti-submarine helicopters at Yeovil on 2nd October. Seventeen HAS.5s have been ordered (they were originally to have been HAS.2s but the contract was changed before completion) and it is planned to bring the Navy's existing HAS.2s up to Mk. 5 standard.

With an all-up weight of 21,000 lb., the Sea King HAS.5 has the new Decca 71 radar and tactical air navigation system, Marconi LAPADS data-processing equipment, and is equipped to carry sonobuoys as well as the earlier variants' dunking sonar. There is provision for MEL Sea Searcher radar to be fitted later.

The new equipment will enable the Sea King to pinpoint an enemy submarine at a far greater range than previously and destroy it with torpedoes if necessary. In addition, the Sea King HAS.5 will be able to monitor signals from sonobuoys dropped by R.A.F. Nimrods as well as from its own sonobuoys.

A crew of four will be carried, with the dunking sonar operator also monitoring the LAPADS equipment at an additional crew station. To make room for the extra equipment, the Sea King's cabin has been enlarged by moving the rear bulkhead 6 ft. further into the tail.

First of seventeen Westland Sea King HAS.5s for the Royal Navy, XZ916 was handed over at Yeovil on 2nd October. Note revised shape of dorsal radome

Boeing orders

TAME—Transportes Aereos Nacionales Ecuatorianas C.A., Ecuador's main domestic airline which was founded in 1962 as a branch of the Air Force, have ordered their first Boeing 727-200. The aircraft was delivered on 30th September and joins a fleet of Lockheed Electras, Hawker Siddeley HS 748s and D.H. Canada Twin Otters.

Wistair International of Texas have ordered a 727-200 for use as an executive jet. Wistair are the 100th customer for the 727 and their aircraft is due for delivery next year. Announced orders for the Boeing 727 now total 1,812 of which 1,653 have so far been delivered.

The 737 twinjet also recently attracted its 100th customer—Air Pacific of Fiji, who have ordered one 737-200 for delivery in October 1981.

Southwest Airlines of Okinawa have ordered their fifth 737-200, for delivery in October 1982; and privately owned Supair of Munich have ordered two 737-200s for 1982 delivery and placed options on a further two. Supair recently bought two 737s from Maersk Air and plan to start operations to the Mediterranean next year. Sales of the 737 now stand at 840 with 690 delivered.

United Airlines, who launched the Boeing 767 programme with a thirty-aircraft order in July 1978, have converted options on a further nine into

firm orders. All thirty-nine aircraft will be delivered between 1982 and 1984, in addition to which United hold options for a further thirty. Orders for the 767 now total 161 firm plus 129 options.

Roll-out of the first 767 at Everett, Washington, is scheduled for August 1981 and deliveries to customers (United being the first) is expected to start in August 1982.

It is reported that Transbrasil, the Brazilian domestic airline, have ordered three of the new Boeing 757-200s with options on a further two. The order—the first since the Eastern Airlines/British Airways launching contract in March 1979—is subject to financial agreement between U.S. banks and the Brazilian Government.

Airbus sales

Cruzeiro do Sul, the Brazilian airline, have converted their option on a fourth A300B4-200 Airbus into a firm order. The aircraft is due to be delivered in June 1982. Orders for the A300 now total 201 and there are options on a further 81.

EgyptAir, the Egyptian flag-carrier, took delivery of the first of three A300B4-200s, which has been named "Horus", on 26th September, followed by the second aircraft, "Osiris", on 30th September. The third machine, "Nout", will join the fleet in September 1981.

Kuwait Airways have ordered five more A310s, increasing their total to eleven. The type will be introduced on Kuwait's routes to Europe, the Middle and Far East in 1983. Sales of the A310 now total 76 plus 68 options.

S-76 sales pass 400

On 24th September sales of the Sikorsky S-76 helicopter soared past the 400-mark to 418 with the announcement of orders for a further twenty-one—ten for Bristow Helicopters, two for Toronto Helicopters, five for Shirley Air Services, and four for EXXON U.S.A. It is understood that the name "Spirit" has now been dropped in deference to the religious sensibility of certain Latin American countries.

The new batch of ten for Bristow's will be delivered in 1983 and will increase their total to thirty-eight.

Toronto Helicopters' two new S-76s will be delivered in March 1984 and bring their total up to seven. The Canadian firm expects to take delivery of its first S-76 in July 1981.

For Shirley Air Services, another

First of eight British Aerospace Hawk T.53s for the Indonesian A.F., LL-5301 and three others were delivered in time for Indonesian Armed Forces Day, 5th October

First of four Boeing 737-200s for Ladeco of Chile, CC-CIM is seen over Mount St. Helens volcano, Washington State, before delivery

First of fifteen McDonnell Douglas DC-9 Super 80s for Swissair, HB-INC "Thurgau", seen at Zurich with one of the airline's DC-9-32s, was delivered on 12th September and put into service on the London–Zurich route on 5th October; it seats 135 passengers. Austrian Airlines took delivery of their first Super 80 (eight ordered) on 3rd October

Brazil's new Embraer EMB-312 turboprop trainer (first flown 16th August) has won its first export order—from CSE Aviation, Kidlington, for three aircraft

World Air News . . .

Canadian operator, based at Edmonton, Alberta, the five new S-76s will be their first and are to be delivered between 1983 and 1985.

EXXON U.S.A., based at Houston, Texas, are another new S-76 customer and their four machines will be delivered between late 1983 and early 1984.

BMA's Atlantic route

Starting in the spring of 1982, British Midland Airways will be the fourth British airline to operate scheduled services to North America. The Civil Aviation Authority recently granted BMA a licence for a new route linking Birmingham, Belfast and New York. Services will be operated by Boeing 707-320Cs.

China's new airliner

A new Chinese four-engined jet airliner, the YC-10, has made its first flight at Peking, date unspecified but believed to have been during September. It is powered by Pratt & Whitney JT3Ds from a batch of spare engines acquired when C.A.A.C. bought ten Boeing 707s in 1972.

Outwardly the YC-10 resembles the Boeing 707 but is somewhat smaller (10 ft. shorter fuselage) and seats about 120 passengers.

Anti-ship Jaguar

British Aerospace state that an undisclosed country is interested in a maritime-strike version of the Jaguar International. For operation from shore bases, it would be fitted with Thomson-CSF Agave radar and carry anti-ship missiles such as Harpoon plus Matra Magic AAMs for self-defence.

At the recent Farnborough Show Jaguar GR.1 XX979 was displayed statically with the Agave radar, two Harpoons and two SNEB rocket pods.

Friendship sales

The Fokker F.27 Maritime displayed in Angolan markings at this year's Farnborough Show (photo in October issue, page 384) has now been delivered and, based at Luanda, is being operated by TAAG—Angola Airlines on fishery protection, sea surveillance and search and rescue duties along the country's 1,600-km. coastline.

Sonangol, the state-owned oil company of Angola, have ordered an F.27 Friendship Mk. 500 to replace a Dakota. It will be delivered in March 1981.

Air New Zealand have ordered two more Friendship Mk. 500s for delivery in July and October 1981. ANZ, who are gradually replacing their older Mk. 100s with Mk. 500s, at present have nine of the earlier variant and eight Mk. 500s. Sales of the Friendship now total 715.

Brasilias for Air Ecosse

First customer for the Embraer EMB-120 Brasilia airliner is Air Ecosse who have ordered five.

Air Ecosse, who completed their first three years' trading in July, are planning a major expansion of scheduled services and have applied to the C.A.A. for several new routes, including Aberdeen–Belfast and Dundee–Gatwick. Initially these would be served by the nine current Bandeirantes, which would be superseded by the Brasilias from mid-1983 onwards.

Details of the EMB-120 appeared in the August issue, page 288.

500th HS 125 sold

Manufacturers Hanover Corporation of New York City, the fourth largest bank in the U.S.A., have ordered two British Aerospace HS 125 Series 700 business jets, bringing total sales up to 500. The order was announced on 24th September during the National Business Aircraft Association Convention in Kansas City.

The 500th aircraft (second for Manufacturers Hanover) is also the 300th HS 125 to be sold in North America and the 142nd Series 700 sold worldwide.

D.H. Canada sales

Air Niugini, the national airline of Papua New Guinea, have ordered three D.H. Canada Dash 7 STOL airliners and placed options on a further two. The aircraft, which will replace Fokker Friendships, are scheduled for delivery in September and December 1981 and April 1982.

The order announced earlier this year for two Dash 7s, plus two options, from Puerto Rico International Airlines (Prinair) has been cancelled due to financing difficulties. Firm orders for the Dash 7 now total 37 plus 54 options and to date 28 aircraft have been delivered.

The Ecuadorean Army (*Servicio Aereo del Ejercito*) has purchased a DHC-5D Buffalo which will be used for civil transport duties to remote communities as well as Army transport and paratroop training. Ecuador's Air Force at present operates two Buffaloes and three Twin Otters.

More than 100 Buffaloes have now been delivered to fourteen countries, including 42 to South America (Brazilian A.F. 24, Peruvian A.F. 16 and Ecuadorean A.F. 2).

Full-scale mock-up of an advanced combat aircraft designed by British Aerospace Warton. Note foreplane immediately in front of wings and down-angled engines for ultra-STOL performance. A related but different design was illustrated in the June issue, page 207

NEWS IN BRIEF

First of ninety Aérospatiale SA.366G Dauphin IIs for the U.S. Coast Guard, c/n. 6002, temporarily F-WZJT, made its first flight at Marignane on 23rd July. In U.S.C.G. service the type will be known as the HH-65A Dolphin

British Caledonian Airways have named their seventh McDonnell Douglas DC-10-30 "James S. McDonnell —The Scottish American Aviation Pioneer" in memory of the U.S. manufacturer's founder who died earlier this year. The aircraft was handed over on 17th October.

British Airways are to name their ten Rolls-Royce RB.211-engined Boeing 747s after major British cities, starting with "City of Birmingham".

Eighteen U.S.A.F. McDonnell Douglas F-15 Eagle fighters of the 33rd TFW, Eglin AFB, Florida, have been deployed to Bremgarten, West Germany, from 2nd October until 5th November.

McAlpine Helicopters have ordered their first Aérospatiale AS.365N Dauphin 2. It will be delivered next spring, together with ten AS.355 Ecureuil 2s ("Twin Squirrels")—see article in May 1980 issue.

Four R.A.F. Vulcans (two from No. 617 Squadron and one each from Nos. 44 and 101 Squadrons) are competing in the U.S.A.F.'s annual "Giant Voice" bombing competition; they left the U.K.on 6th October. Also competing, for the first time, are General Dynamics F-111s of the R.A.A.F.

The Egyptian A.F. has ordered fifteen Boeing-Vertol CH-47C Chinook helicopters from Agusta of Italy who build the type under licence.

Eight U.S.A.F. McDonnell Douglas RF-4C Phantoms of the 186th TRG, Mississippi Air National Guard, from Key Field, Meridian, were deployed to R.A.F. Alconbury from 27th September to 10th October.

Comair Inc., the U.S. commuter airline based at Cincinnati, Ohio, have ordered their first Embraer EMB-110P1 Bandeirante and placed options on two more. The aircraft is due to be delivered next month (December).

BWIA International (see August, page 303) have converted their options on two Lockheed TriStar-500s into firm orders, bringing their total to four.

Chiricana (Empresa Chiricana de Aviacion), a new Panamanian airline, has been formed to operate services from Panama City to towns in the province of Bocas de Toro.

The Swiss Government looks set to order the British Aerospace Rapier low-level air defence missile system. Value of the contract would be about £250 million.

The U.S. Navy has acquired a Convair 880 from the Federal Aviation Administration and is having the aircraft converted into a tanker for refuelling F/A-18 Hornets during their operational trials.

The Soviet Navy is reported to have adopted a tanker version of the Ilyushin Il-76 ("Candid") transport for refuelling its "Backfire" bombers.

The French A.F. may order another twenty-one Dassault Mirage F 1C fighters, bringing its total to 246, to compensate for a delay in the Mirage 2000 programme.

The U.S.A.F. has ordered nine Boeing E-3A Sentry AWACS aircraft, bringing its total to thirty-four.

The 750th Cessna Citation, a model II, was delivered to the Minster Machine Co. of Minster, Ohio, on 18th September.

New York Helicopter Corp. are planning a new service linking Kennedy, LaGuardia and Newark Airports with Manhattan, using five Aérospatiale SA.360C Dauphins.

The French A.F. may allocate some of its Dassault-Breguet/Dornier Alpha Jet trainers to the close air-support role (as done already by the *Luftwaffe*). An Alpha Jet fitted with a new super-critical wing is due to fly shortly.

Lockheed may drop their L-400 Twin Hercules project owing to a lack of firm commitments by potential customers, particularly from overseas.

The Belgian A.F. has cut pilot flying time to 120 hours a year (30 hours less than the NATO standard) due to a lack of funds.

A Dewoitine D.520, France's finest fighter in World War II, has been restored to airworthy condition and was demonstrated at Le Bourget on 20th September.

The first two German Panavia Tornadoes, GT.004 and GT.005, arrived at the TTTE, R.A.F. Cottesmore, on 3rd and 2nd September respectively.

First Swedish A.F. unit to convert to the SAAB JA 37 fighter version of the Viggen is F 13 Wing at Norrköping, seven of whose fighters are seen here. Also now converting to JA 37s is F 17 Wing at Ronneby in southern Sweden

Air Affairs

A monthly commentary by JOHN STROUD

THE SUBJECT of aircraft accident investigation and the subsequent reports has long been a controversial issue. The chief criticism in the past has been the length of time between the accident and the publication of the report, the criticism being caused mainly by concern that further accidents might happen for the same cause before the report could alert all concerned to a particular hazard.

I think this problem has been overcome, essential preliminary findings being circulated as soon as dangerous shortcomings are revealed. On the other hand, enquiries and reports have not been helped by the new breed of legal vultures (particularly in the United States) ready to pounce on any aspect which might produce heavy damages to victims or relatives and, of course, a good percentage to the lawyers.

No one can argue against full investigation of accidents and the quickest and fullest publication of the findings and recommendations, although far too many reports make no recommendations. But I must say that it seems to me that in the United Kingdom the Department of Trade appears to have gone too far.

At fairly regular intervals the Department issues its AIB (Accidents Investigation Branch) Bulletin. For example, No. 12/80 dated 22nd September gives details of twenty-two "accidents". The normal treatment is to list the aircraft type and registration; date and time of the accident; location; type of flight; crew and passengers on board; injuries to crew and passengers; nature of damage to the aircraft; type of licence held by the aircraft commander (a high-sounding description for the pilot of, say, a Tipsy Nipper); and commander's total flying experience, normally with the hours on the type concerned shown in parentheses. Then follows a summary of the "accident".

Let it be said right away that many of these bulletins are useful and something can be learned from the accident reports they contain. But, to me, it seems that the whole business is getting out of hand. Road traffic kills some 7,000 people a year in the United Kingdom while vast numbers are injured, lives wrecked, and enormous cost incurred. There could well be a case for serious investigation and reporting on road accidents, although the true definition of the word does not describe most of the disgraceful happenings on our roads. But no sane person would suggest reports on every car that gets dented while being taken into the garage, although investigation might reveal faulty brakes, steering, eyesight or judgement.

However, in spite of attempts at Government economy, the AIB Bulletins cover aeroplane accidents of such trivial nature. Examples in Bulletin 12/80 include:

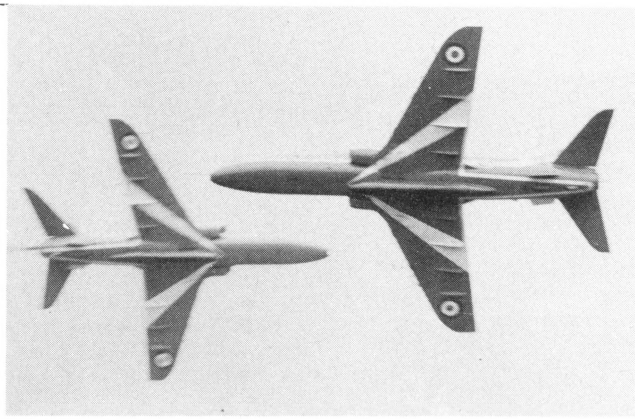
Cessna F.150G G-AVAP at Southend Airport at 10.20 hr. on 7th June 1980. It was a private flight with pilot and passenger. There were no injuries but the port wing leading edge and rear spar of the Cessna were damaged. The "Commander" had 145 hr. experience with 60 hr. on the type. So far so good, but wait for the narrative. "The aircraft was taxi-ing out to take off when the port wing struck a concrete post adjacent to the taxiway. the pilot had assessed the available space to have been adequate for the passage of the aircraft." In this case the question as to why the concrete post was there should be fought out between the insurance people and the airport owner.

Then there is Piper Cub G-BCUB (another of those damned silly registrations) at Bourn Aerodrome near Cambridge at 19.40 hr. on 28th July. The pilot, with 66 hr. experience, had 8 hr. on the Cub. "During landing in cross-wind conditions, the aircraft 'weather-cocked' in spite of the application of full opposite rudder. It ran off the runway into an adjoining field. The runway in use was 19 with a wind velocity of 080 deg./8-10 knots." What does this teach us?

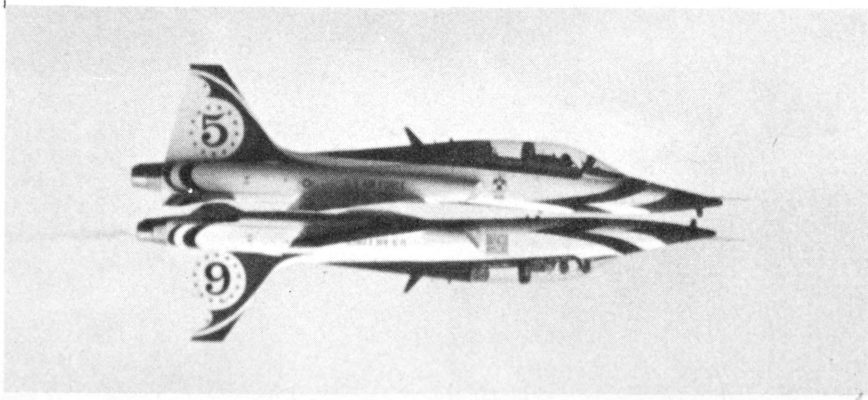
Surely it is a waste of time and money to report such incidents and then issue the details. The whole point of accident investigation is to find the cause and prevent other accidents. There will always be idiots who land wheels-up with the horn going full blast and others who get themselves into trouble through stupidity. Knowing that someone else did it won't stop them.

AEROBATIC ACES

Opening a 5-hour flying programme at R.A.F. Abingdon on 13th September to mark the 40th anniversary of the Battle of Britain was the R.A.F.'s premier aerobatic team, the "Red Arrows". Here two of the team's Hawks are seen at a critical point during their display (Photo: Barry Jones)



Superb mirror-formation flying by two Northrop T-38s of the U.S.A.F.'s "Thunderbirds" team. This was one of the highlights at the display held at Westover AFB, Massachusetts, on 18th–19th June to celebrate the base's 40th anniversary. Originally a bomber training base, Westover today houses the 439th TAW, U.S.A.F. Reserve, equipped with Fairchild C-123 Providers and Lockheed C-130 Hercules (Photo: Marcia L. Coughlin, Pratt & Whitney Aircraft Group—courtesy of the Group's magazine "PowerPlant")



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One of the Swiss A.F.'s yellow and black-striped Federal C-3605s, C-539, at Samaden airfield near St. Moritz. Powerplant is a 1,150-s.h.p. Avco Lycoming T5307A turboprop

Switzerland's Ancient "Zebras"

by WERNER GYSIN-AEGERTER *(Author's photos)*

NOT MANY months ago one of the world's leading powers had to accept a pitiful defeat which, in large measure, seems to have been caused by bad maintenance of its flying material. Even recently fighter planes have had to be grounded for lack of spares or maintenance problems!

In contrast, the Swiss Air Force's "*Zielfliegerkorps*" (target-towing section) continues to demonstrate a high state of efficiency with ancient material. Mostly during winter-time, it provides targets for anti-aircraft troops taking refresher courses. The troops and anyone else who have the chance to witness these operations are usually astonished when they look up in the sky and see these venerable aircraft.

The Swiss Air Force is forced by a niggardly parliament to use its limited budget very carefully and has never been able to afford new target-towing aircraft. Readers will remember that in 1979 the Swiss A.F.'s three Junkers Ju 52/3m's celebrated their 40th anniversary. Not so well known is the fact that two other current types, the Federal C-36 and de Havilland D.H.100 Vampire, have only a few years to go to reach a similar maturity.

Portrait of the C-36

Back in 1935 Ing. Branger of the Federal Aircraft Factory at Emmen submitted his plans for the C-36 to a Government commission. At that time the C-36 was a very modern concept for a multi-purpose fighter but it was rejected by the commission as being "not fit for war"; it was of all-metal construction and could not be repaired in the field in the way that the fabric-covered machines could.

To counter the turboprop's long nose a third, central, fin was added—C-557 illus.

After World War II had started, the commission remembered the once-derided C-36 project and ordered the FW Emmen to build that aircraft without further delay. The prototype C-3601 (with a Hispano-Suiza HS-77 engine of 860 h.p.) flew in August 1939, but unfortunately crashed soon after its maiden flight due to wing buffeting.

As fast as possible a second aircraft was built, this time employing the Hispano-Suiza HS-51 engine delivering 1,000 h.p. This aircraft, which was designated C-3602—and still retained a fixed undercarriage in deference to the "authorities", although the original design featured a retractable gear—was thoroughly tested by the Air Force in April–May 1940. Its performance was good and an order for 150 aircraft resulted. Some changes were specified, the main one being the installation of retractable landing gear. From 1942 onwards the C-3603 replaced the totally obsolete C-35 biplanes still in use with some fighter-bomber squadrons. The C-36s stayed with these squadrons until 1952, only then being replaced by Mustangs and Vampires.

The A.A. troops by now were asking for a faster target, so it was logical to convert the now-surplus C-36s for this duty. After tests with various winch-systems (the Firefly winch was tested but abandoned because the attachment points under the C-36's wing were too far from the centre of the plane!), forty C-36s were modified to employ the SZW-52 winch produced by Naef at Fischenthal. From 1953 on the metal and red-striped C-3603s were in use at all A.A. ranges.

In the mid-1960s (after a good 20

years) the Swiss A.F. had no more spare parts for the ageing Hispano-Suiza engines and a replacement aircraft tug had to be found for the C-36s which had been flying since 1942! The pilots also asked for a twin-engined plane for better safety when flying in the narrow and deep valleys, where an engine failure is a deplorable adventure. So there started an evaluation of the following types: Fairey Gannet Mk. 4, Beechcraft-SFERMA Marquis, North American T-28, North American OV-10A Bronco, Short Skyvan, Pilatus Turbo-Porter, Dornier Do 28, Mitsubishi MU-2 and Gates Learjet.

None of these aircraft met Swiss requirements, or if they did, they were far too expensive. At this stage someone remembered a suggestion made by Ing. Waibel of the Federal Factory at Emmen to convert the surviving C-36s into turboprops. Careful tests had shown that their airframes were fit enough and had in fact been built from the beginning with such a safety margin that there were no structural problems.

More difficult to resolve was the change in the centre of gravity caused by a turbo-engine which was 300 kg. lighter than the old Hispano. However, it was solved—although one has to admit that the side-view of a C-3605 doesn't look very attractive—but the thing flew well and has continued to do so for another ten years already.

The task originally performed by forty piston-engined C-36s is done easily by the twenty-three turboprop C-3605s available. In a couple of years the one and only W.W.II fighter aircraft converted in series to a turboprop configuration will be able to celebrate its 40th anniversary. How about that!

Trio of red-striped C-3603 target tugs, with their original Hispano-Suiza HS-51 piston engines, at Sion circa 1970. Note that tails are twin-finned

Swiss Vampires

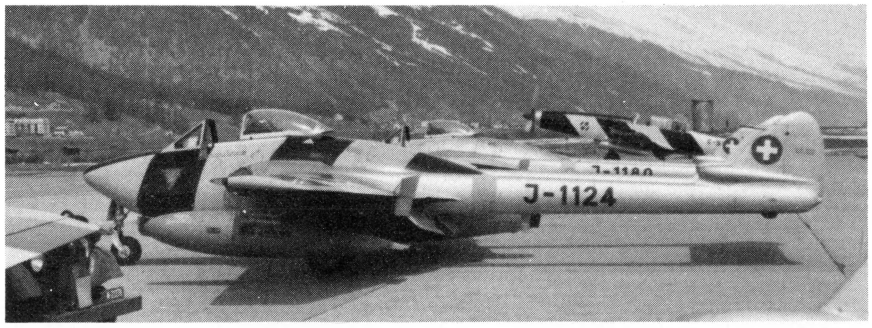
Shortly after the war a Swiss delegation visited the de Havilland factory at Hatfield to have a look at the Vampire which, it will be remembered, first flew on 20th September 1943. Deeply impressed, the Swiss ordered three Vampire Mk. 1s for evaluation, in particular to find out how a jet would perform in alpine surroundings and weather. Apart from a take-off accident in August 1946, the evaluation proceeded satisfactorily and in 1948 seventy-five Vampire Mk. 6s were ordered. These aircraft were delivered the next year and replaced some squadrons of EKW-3800s (licence-built Morane 406s) and Messerschmitt Me 109s. It might be of interest to note that in 1948 the Swiss A.F. was also able to buy 130 North American P-51D Mustangs from the U.S.A.F. at a price of $4,000 each.

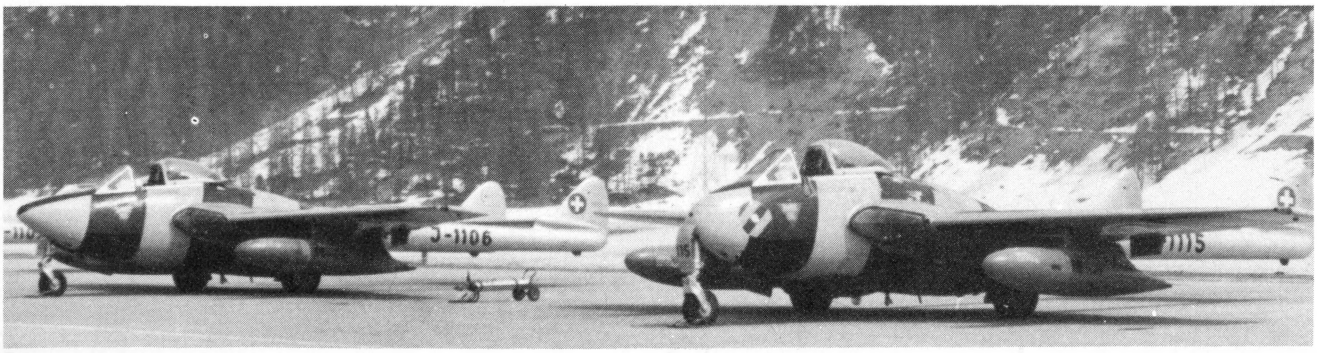
While the Vampires were still being delivered a licence agreement with D.H. for the production of a further 100 Vampire Mk. 6s in Switzerland was signed. The D.H. Goblin engines for these aircraft were flown over from England in the Swiss A.F.'s three Ju 52s.

Later, since the Swiss found the Vampire suited them well, they negotiated a licence for the manufacture of its successor and eventually 250 Venoms were built (including the engines this time) in Switzerland.

In 1954 the Venoms began replacing Vampires in front-line squadrons and the latter, still in perfect technical order, were now free for new duties. They started being employed as trainers and target-tugs or, more accurately, target-markers for A.A. troops. Through modifications, mainly the installation of Martin-Baker ejection seats and blind-flying instrumentation, the Vampires were kept up to date.

In 1978 the first brightly painted black and orange "Zebra" Vampires were flown. A year later some of the Vampires were modified with a pointed nose (as used before by the Venoms), which gives more room for newer radio equipment. It seems likely that the Vampire will outlive its successor, the Venom, but there is little doubt that this beautiful twin-boom "blow torch" will also, in its time, celebrate 40 years of service in the Swiss A.F.





Right: *Orange and black-striped D.H. Vampire J-1124 with modified pointed nose at Samaden*
Below: *Vampire J-1115 retains the original nose shape while that of J-1106 has been modded.*

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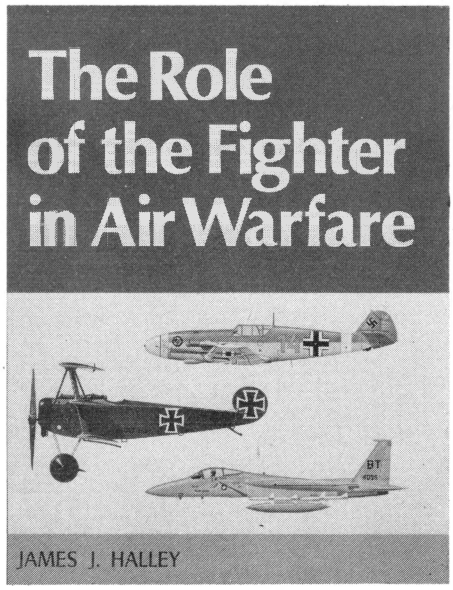

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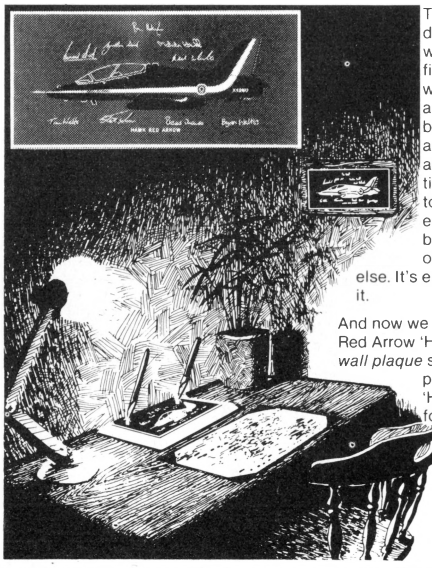

The RAF's Red Arrows aerobatic display team, which became world famous flying Gnat fighters, has been re-equipped with Hawk advanced trainer aircraft. Their virtually unrivalled blend of skill, grace, accuracy and daring thrills crowds here and abroad as many as three times a day, jetting from airfield to airfield showing the flag and encouraging enlistment with breathtaking flying skills the like of which we can see nowhere else. It's entirely British. And we're proud of it.

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Among the more unusual types at R.A.F. Alconbury for the U.S.A.F.'s Air Show on 16th August were (Left) *A. E. Hutton's Czech-built Yak-11 G-AYAK, which forced-landed in Cyprus in 1964 and was rebuilt by personal Plane Services in 1970; and* (Right) *Piper L-4H G-AXAR, 43-29601, repainted in U.S. Army colours and with Invasion stripes (Photos: Michael B. Taylor, Cambridge Aviation Photographers)*

Dear Sir...

Letters and photos of general interest are welcome and will be considered for publication—but they should be kept as short as possible. Will readers requiring acknowledgment of their letters please enclose a stamped addressed envelope.

Auxiliaries—some suggestions

Mr. John Wilkinson's article (September issue) on the role of R.A.F Reserves raises a number of interesting points. I agree that some major reform of the R.A.F.'s Reserves is now of pressing importance, particularly when one considers the possible loss of expertise should short-service commission aircrew exercise their options; considerable expertise is already being lost by officers retiring at their 38/16 option points. But first I should like to comment on some other points.

Mr. Wilkinson suggests embodying the British civil air fleet into the R. Auxiliary A.F., but I do not think this is feasible as any reserve force is voluntary and enough volunteers may not be forthcoming, for commercial reasons if nothing else.

I agree with his idea that any future R.Aux.A.F. squadrons should be equipped with the BAe Hawk, but can see no way that Hawks could be used for intervention in Africa and Asia. The Hawk undoubtedly has a good range, but to expect an intervention force to rely on aircraft lacking in-flight refuelling capability is unrealistic. The use of Hawks on the Central Front in Europe in the close air-support role also seems unrealistic in view of the very high multi-threat environment envisaged over and behind the front line; at present the Hawk has a rudimentary navigation fit and total lack of electronic warfare devices. It is interesting to note that though the *Luftwaffe* intends to use the Alpha Jet (comparable to the Hawk) for close support, the second seat on operational aircraft will be occupied by EW equipment for use by the (single) pilot. Finally, operation in the high-speed low-level ground-attack role needs constant and dedicated practice such as only full-time flying can give.

May I now put forward some further suggestions for our Auxiliaries:

Roles allocated must be of the type that would enable a reasonable standard of proficiency to be maintained on limited flying time. For the Hawk these could include day (visual) air defence with radar assistance, with a combination of the 30-mm. gun and AIM9L Sidewinder, for base and rear echelon defence. To this end, the possibility of using R.Aux.A.F. squadrons in support of R.A.F. Germany and U.K. bases may be considered. Analysis of the use of the Hawk in Exercise "Elder Forest" will give evidence as to the viability of this concept.

Another role for the Auxiliaries might be offshore patrol and maritime search, in peacetime as well as wartime. The Canadians already operate Trackers in this role, in addition to Otters and Kiowas for SAR and support.

In Northern Ireland reserve forces play a large role in operations (*i.e.*, the UDR). Perhaps they might be given their own liaison/support unit under the auspices of the R.Aux.A.F. and used for border patrols with light aircraft as the Irish A.A.C. do.

Aircraft for use by the Auxiliaries must be relatively cheap, simple and easy to fly and maintain. The Hawk has already been mentioned and in use with R.Aux.A.F. units should fly with a two-man crew, pilot and navigator. I stress this as an individual's flying times would of necessity be limited and workload can thus be split—and in operational use two sets of eyes are much better than one! Should these units come to fruition, they could be organised on a two-Flight basis, one with Hawks and one with (perhaps) Jet Provosts, the latter being cheaper to operate for refresher flying and to keep up flying hours. Should the need arise, the Hawks could be augmented by ex-T.W.U. aircraft.

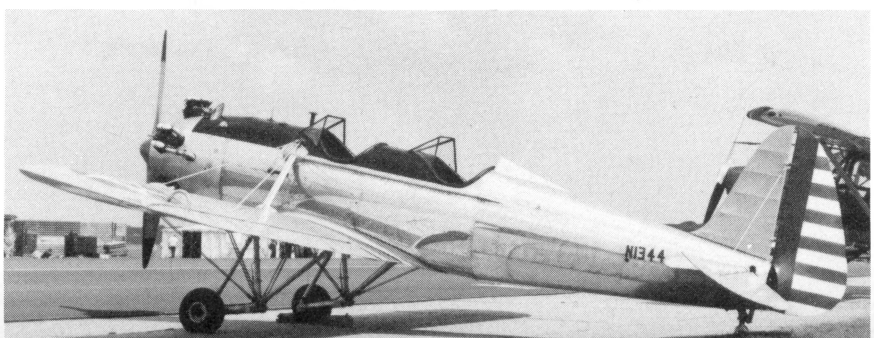
As for the proposed maritime role, the Britten-Norman Maritime Defender would appear to be the logical choice.

Any Auxiliary squadrons must have regular base support (at least in peacetime) and must also be reasonably close to the larger conurbations. Units would have to be based at a regular station for administrative support and engineering servicing facilities, which would be expensive to provide at a civil airfield. However, the idea of having some servicing done by civil firms under contract might be examined. A "town H.Q." would have to be provided for ground training at weekday evening sessions. For example, the use of R.A.F. Abingdon would enable personnel to travel from both the London and Bristol areas. There are many other possible stations, but Abingdon is mentioned as the London U.A.S. is already based there.

Personnel should, initially, be ex-Service with trades recruited not just on the flying and engineering sides but also ATC and administration to enable a degree of autonomy. Later, perhaps, suitably qualified civilians could be recruited, particularly for aircraft such as the Defender.

Britain is fortunate in having a long tradition of voluntary military territorial (reserve) service but the R.A.F. does not at present appear to be taking advantage of the talent, enthusiasm

Also at Alconbury on 16th August was Ryan PT-22 N1344, c/n. 2086, ex 41-20877, owned by Bob Mitchel and flown by his wife (Photo: Michael B. Taylor)



Dear Sir . . .

and experience available. Why not try out the scheme (as in the case of R.Aux.A.F. Regiment squadrons) on a small experimental basis to see what the response is like? For example, Jet Provosts could be used in two squadrons at two stations, say Abingdon and Finningley.—*Andrew Thomas, Honington, Suffolk.*

R.A.F. P-38 at Northolt

John May's letter on rare military types used by the British Services (July issue, page 270) reminded me of an unusual Lockheed P-38 Lightning I saw at R.A.F. Northolt during one of several visits I made there with the A.T.C. The aircraft was housed in one of the main hangars and appeared immaculate, being painted overall in a glossy P.R.U. blue but with R.A.F markings and the U.S. serial 423517; it was of the "Droop-snoot" variety.

At the time—it was after D-Day—Northolt's usual fighter squadrons had moved closer to the battle areas to be replaced by a Coastal Command unit with Wellington XIVs, Hurricane IIs of a mail delivery unit and a Mosquito P.R. squadron. Perhaps the C.O. of the latter unit had traded his own Mosquito for the P-38 with an opposite number in the U.S.A.A.F.?

While writing, I would welcome information on the reason for the presence of a number of Douglas Boston IIIs at the Hawker airfield at Langley, Bucks., in 1945. I recorded BZ225 (232980), BZ280 (232035), BZ334, '342 and '343 at different times.—*C. R. Miller, Ealing, London.*

Douglas types in Malta

Regarding the Douglas types in Malta that have been the subject of several letters in recent issues, I have rechecked the F.A.A. master files in Oklahoma City to find the current status of the three aircraft mentioned. All of them have spent a good portion of their lives outside the U.S.A. Conoco, to which one writer referred, is Continental Oil Co., and the DC-3s are registered to that company.

N535M was, after World War II, YV-C-AVR until mid-1960 when it was sold to Ohio Oil International of Libya Inc., which operated as a consortium with Continental Oil and Amerada Petroleum of Libya Inc.

Likewise, after World War II, N565 was XB-KOH until 25th April 1956 when it was sold to Ohio Oil (etc.) as above and operated in the same group.

The DC-4 N88887 has more complex moves in its history. It was assigned as "Surplus Property" to the Reconstruction Finance Corp., as military serial 44-9063, on 21st September 1945 and was sold to Pan Am on 8th February 1946 as a C-54E. Pan Am sold it to Swissair on 24th March 1952. Later it went to Aer Turas Teoranta as EI-ARS, from which it was cancelled on 22nd June 1977. While in Switzerland the aircraft had a large cargo door installed under a Swiss STC. When the DC-4 returned to the U.S.A. in 1977, despite the Irish registration marks, it was sold to Globe Aero of Florida by Air Falcon Ltd. of Sharjah, United Arab Emirates. It proceeded via one transfer to the ownership of L. C. Vogel Inc. of N.Y.C. on 19th December 1978. A letter of early 1979 shows the aircraft operated by, or in care of, Transair Ltd. of the U.K. As at 19th November 1979, its total flying time stood at 63,138.31 hours.—*Harry B. Adams, Wichita, Kansas, U.S.A.*

Strathallan Collection

A tragic blow to aviation enthusiasts world wide was dealt on Thursday, 7th August 1980, when the owner of the Strathallan Aircraft Collection announced that the Collection would close to the public in October of this year and that the majority of its aircraft would be sold, probably in March 1981, if not before.

The Collection has taken ten years of extremely hard work by individuals and bodies to establish and is now one of the best live collections in Europe, containing airworthy examples of the Lancaster X, Hurricane II, Mosquito B.35, and of course the much publicised rebuilt Lysander in No. 309 (Polish) Squadron colours, to name but a few.

The Society is currently trying to explore ways of saving the Collection from this terrible fate. A petition has been drafted and has gained immediate support—some 12,000 signatures have been received in the past four weeks—but this is only the first step. Speed of attack is vital in this project, as we believe that a petition on its own will have little effect.

As the Collection's aircraft will, no doubt, leave the U.K. and be distributed world wide, it is proposed that a *Society Trust Fund* be established to handle donations and sponsorship, in an effort to retain the majority of the aircraft as a viable Collection. Any donations, offers of sponsorship, or suggestions would be greatly appreciated, and these should be addressed to the Secretary, Strathallan Aircraft Society, at the address below.

If you, or perhaps a colleague, feel strongly about the threatened closure of the Collection, please send a supportive letter directly to the General Manager, Strathallan Aircraft Collection, at the same address. We need your support.—*P. Hapka, Strathallan Aircraft Society, Strathallan Airfield, Auchterarder, Perthshire, Scotland PH3 1LA.*

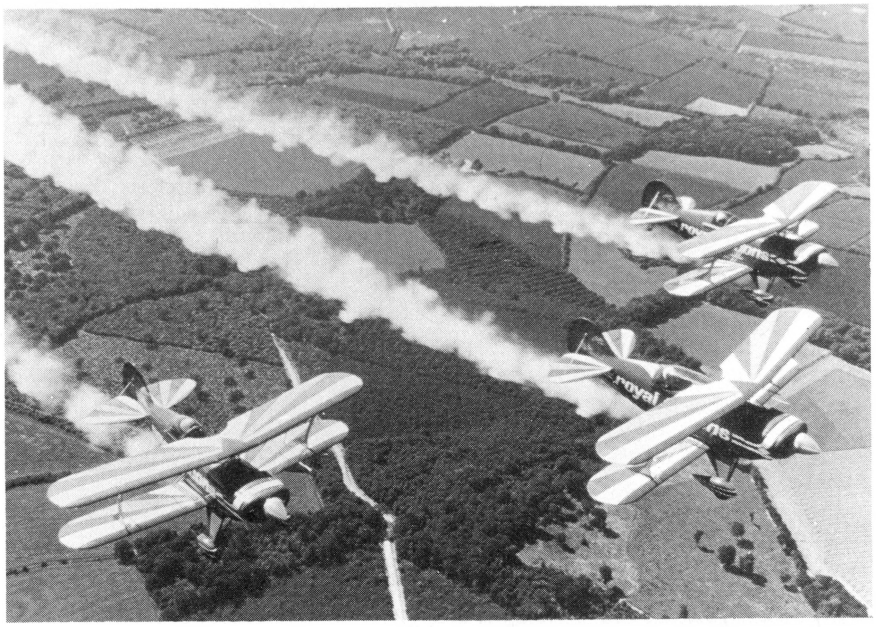
Schiphol dates

Following the correspondence on the year the photograph of the Schiphol Airport movements board was taken (picture published in your February issue, page 57), I suggest 1929 for the following reasons:

(a) Four of the KLM aircraft listed on the board did not enter service until 1928: 'AEH in May; 'AEI in June; 'AEN and 'AEO both in September. PH-AEN and 'AEO were both sold to Air Orient of France in February 1931 and cancelled from the Dutch register in November and June 1931 respectively.

(b) Fokker F.XIV PH-AEW was not built until early 1929.

Left: *On view at R.N.A.S. Yeovilton's Air Day on 1st August was H.M.S. "Amazon's" Westland Lynx HAS.2 XZ246 with dummy Sea Skua air-to-surface missiles, portent of the real thing.* Right: *Another Lynx improvement is the fitting of ESM equipment in the box seen on the nose of H.M.S. "Danae's" XZ699. At present all Lynx are parented by No. 702 Squadron which will concentrate on training when No. 815 re-forms; all Lynx are likely to move from Yeovilton to Portland next year (Photos: J. D. R. Rawlings)*



Jordan's "Royal Falcons" and their Pitts S-2A Specials presented themselves to the Press at Biggin Hill on 21st August. In the group shot are (left to right): Hani Zumot, leader, who flies JY-RJJ; Jalal Kattab, No. 3 in JY-RJH; and Adnan Takruri, No. 2 in JY-RJG. Aerial view shows the team in action in the positions just described (Photos: Malcolm English)

(c) I consider it possible that, despite the fact that ABA's S-AAAE was re-registered SE-AAE in May 1929, some "old hand" in charge of updating the movements board every day, mistakenly used the S- registration instead of the comparatively new SE- system. After all, the SE-AAE registration at that time was only four months old, while Swedish aircraft visiting Schiphol had carried S- registrations for many years prior to that date.

Concerning point (b) above, allow me to make some other observations. The Fokker F.XIV in its single-engined freight version was not built until early in 1929, but it did not appear on the Dutch civil aircraft register until 30th April 1931 as PH-AEW, by which time it had been rebuilt as a three-engined eight-passenger aircraft. The aircraft, either in its single-engined or its three-engined version, was never accepted by KLM, but the fact that KLM Capt. Wiersma flew it on a freight service to London may not have been all that unusual!

It was not uncommon for KLM before World War II to make pilots, engineers or wireless operators available to other organisations for their short-term needs. It is also possible that KLM "borrowed" the F.XIV from Fokker because of a temporary equipment shortage which otherwise would have resulted in cancellation of the scheduled KLM London freight service.

Despite thirty years of searching, I have never come across a picture of the single-engined F.XIV carrying the PH-AEW registration. Several photographs exist of the three-engined F.XIV, however, with this registration. Perhaps some other reader can help?—*Joop Gerritsma, Welland, Ontario, Canada.*

Fighter Command, August 1943

I am writing a book about the American raids against Schweinfurt and Regensburg which took place on 17th August 1943 and wish to cover the considerable R.A.F. Fighter Command effort which helped to escort the Americans and create diversions. Thirty-two Fighter Command squadrons were involved.

May I appeal for any of your ex-fighter readers who flew on this day to contact me. All I need at present is names and addresses and the identity of the squadron. I will then give more details about the type of information I am seeking. I am particularly hopeful of finding men who flew with Nos. 3, 129, 175, 181, 182, 222, 303, 331, 332, 341, 403 and 485 Squadrons. —*Martin Middlebrook, 48 Linden Way, Boston, Lincs. PE21 9DS.*

German 4-motors in B.o.B.

I have just seen Brian Kilrain's interesting letter in your February issue. Early in September 1940, when I was a 14-year-old schoolboy living near Croydon, I saw a raid coming in from the direction of Maidstone. The bombers were in "boxes" of about twelve and in one of them I saw what I was sure was the distinctive shape of a Junkers Ju 90. I would guess the height as about 8,000 ft. The box was under attack by fighters.

When I mentioned this shortly after the war, I was ridiculed and perusal of the many authoritative books on the Battle and the aeroplanes used led me to believe that I was mistaken. Perhaps I was not?—*A. J. Pike, Petersfield, Hants.*

Rare shot of a Hawker Siddeley Trident of the Chinese Air Force, serial 50057. It was photographed at Nanning in June by Brian G. Nichols while operating the service from Canton on behalf of C.A.A.C.

Ambassador book

I am compiling a long-overdue history of the Airspeed AS.57 Ambassador for a book hopefully to be published in March 1982 on the 30th anniversary of the type's entry into service with British European Airways (class name "Elizabethan").

I would be grateful to hear from anybody who can help me in my research. Anecdotes from ground or flying crew would be useful, as would photographs and any other information about this graceful airliner.—*J. Graham Cowell, 51 Crossway, Petts Wood, Kent BR5 1PE.*

The two U.S.A.F. Boeing B-52D Stratofortresses of the 337th BS, 96th BW, detachment at R.A.F. Upper Heyford—56-0677 framed under the 4×0.5-in. tail guns of 56-0585

Stratofortress Sortie over Europe

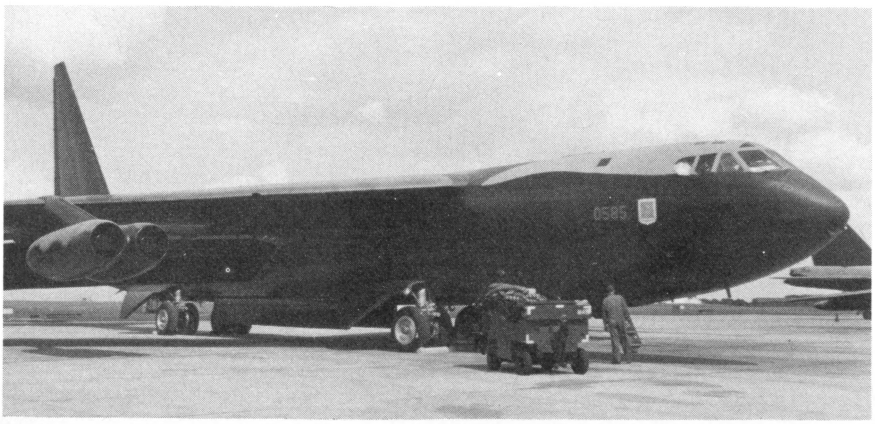
by MALCOLM ENGLISH *(Author's photos)*

DURING THE period 15th–18th July this year two U.S.A.F. Boeing B-52D Stratofortresses visited R.A.F. Upper Heyford, Oxfordshire, on temporary deployment (TDY). A third B-52D scheduled to be part of the detachment had to abort en route. These two aircraft, 56-0585 and 56-0677, from the 337th Bombardment Squadron (BS), 96th Bombardment Wing (BW) of Strategic Air Command (SAC) based at Dyess AFB, Texas, were the second detachment of B-52Ds to visit the United Kingdom this year.

I was invited to fly in Stratofortress 56-0585 on a sortie which was intended to provide the SAC aircrews with experience of the European operating environment and as a high-altitude electronic counter-measures (ECM) exercise. The sortie, involving both aircraft, was to include air-refuelling and the use of ECM during fighter interceptions and against ground radars, including surface-to-air missile (SAM) sites. Our flight path over France and Italy was chosen to pass over SAM sites and through fighter zones.

Because the pre-flight briefing was scheduled for the unearthly hour of 5.30 a.m., I was kitted out and given a safety/aircraft familiarisation briefing on the day before. First stop for flying suit, boots, gloves and jacket was the base equipment store. Then over to the 55th Tactical Fighter Squadron (TFS) safety equipment section for helmet and oxygen mask. Special attention was paid to ensuring a good fit for the oxygen mask in case of sudden decompression during the flight. A luxury, I thought, was the additional noise-absorption pads fitted in my helmet; I was later to learn how necessary these were.

B-52D 56-0585, the aircraft in which the author flew. Most of the air-to-air photographs were taken through one of the small windows behind the cockpit. Apart from the cockpit and rear gun glazing, these are the only windows in the aircraft



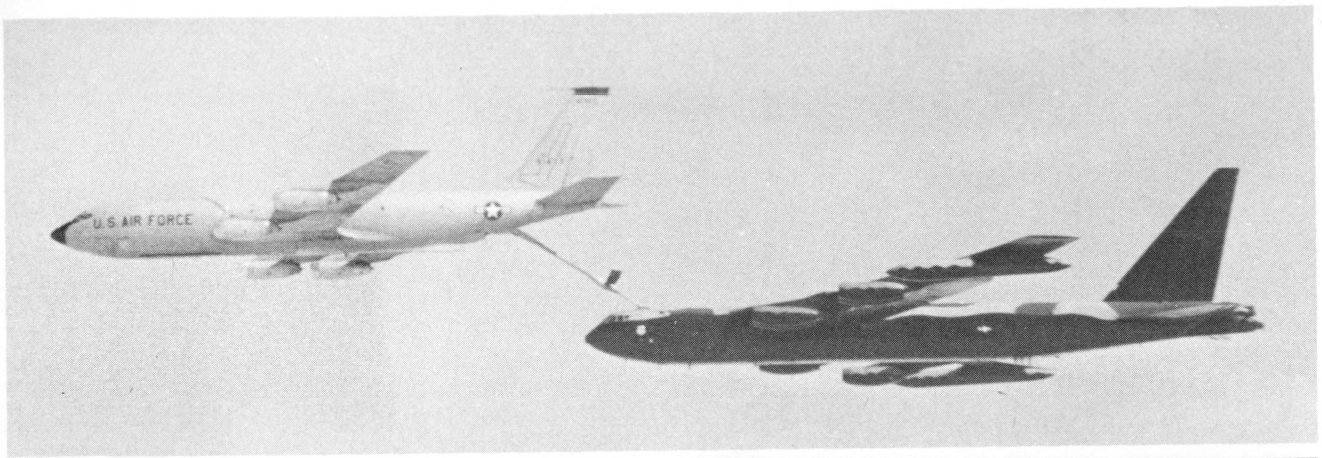
Crew positions

Entrance to the Stratofortress is via a hatch with integral steps, situated directly below the rear of the cockpit compartment. On the first level and immediately forward of the hatch is the navigator's compartment. This is occupied by the navigator and radar navigator/bombardier. They sit side by side in downward-firing ejection seats. A ladder mounted on the starboard fuselage wall affords access up to the flight deck level. The pilot and co-pilot sit side by side in "conventional" upward-firing ejection seats. At all crew stations with ejection seats, jettisonable hatches are located above or below the seats to facilitate ejection. Slightly behind and between the pilots' seats is a seat for an instructor pilot and backing on to it a rearward-facing bunk seat.

Walking back from the flight deck, one has to duck under the wing carry-through structure, then sidestep around the hatchway leading down to the lower, navigators' level. Aft of the hatchway and approximately 15 ft. behind the flight deck is the electronic warfare officer's (EWO) compartment. He sits in a forward-facing upward-firing ejection seat. The remaining B-52D crew member, the gunner, sits in the tail gun compartment, a distance of 130 ft. or so behind the flight deck.

While on the ground the gunner enters through a hatch situated below and forward of his compartment. In flight he is able to commute between flight deck and rear gun via a crawlway. However, as it is unpressurised, it can only be used at relatively low altitudes. As if to deter him further from "wandering", the walkway is so narrow and awkward it would do justice to an assault course.

After escorting me around the aircraft, Lt.-Col. Feigherty, one of the 337th BW Detachment commanders, gave me a safety briefing. As I wouldn't have an ejection seat I was required to strap on a parachute for take-off, while air-refuelling and for landing. In the



event of an emergency my exit was downwards, through the holes made by the navigators who would have jettisoned hatches and ejected—I hoped!

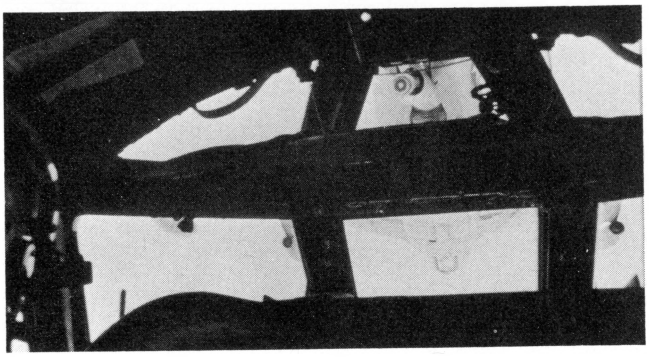
During the briefing I couldn't help recalling a gruesome comment from a B-52 crew member acquaintance: "If a navigator ejected during take-off, he would have the neatest burial anyone could wish for." The Stratofortress has a tandem-wheel undercarriage! Finally, I was shown the oxygen and microphone connection points which would allow me freedom to walk around and remain in audio-contact with the crew.

The day of my flight dawned damp and still, weather that early aviators would have said "has no lift". I arrived at R.A.F. Upper Heyford shortly before the crews who were billeted at R.A.F. Greenham Common. After the pre-flight briefing and a swift breakfast I was driven out to the flight line. There I was introduced to my crew: instructor pilot, Capt. Kenneth R. (Bob) Holey; pilot, Capt. Jim Scheidman; co-pilot, Capt. Douglas E. Smith; radar nav/bombardier, Major Forrest McGill; navigator, 2nd Lt. Patrick G. Goon; EWO, Capt. Thomas Eisenhut; and gunner, Sgt. Robert Phillips.

The standard pre-flight inspection procedure is for the pilot and co-pilot to perform the external checks together, one inspecting the port side and the other the starboard. On this occasion Doug Smith did the honours, with me in tow. Beginning at the rear of the port side Doug checked the "chaff" dispensers; this was to ensure that birds hadn't built a nest in any of the tubes. Making his way forward, he then inspected the wing, and in particular the flaps, for signs of a bird strike. While under the wing he also checked the fluid level in a hydraulic reservoir and pipes and connectors for signs of leakage.

The bomb bay was devoid of stores but was fitted out with three pallets. These were designed and manufactured on base and used for transporting replacement components. All B-52Ds were given a "Big Belly" modification which was completed by the end of 1967. As the name implies, this was

Above: *B-52D Stratofortress 56-0677 refuelling from KC-135 Stratotanker 59-1477 at 26,000 ft. over Cornwall*



Right: *Then it was our turn—view from the cockpit of B-52D 56-0585. Note the boom nozzle seen through the top window and the formation lights under the Stratotanker's nose*

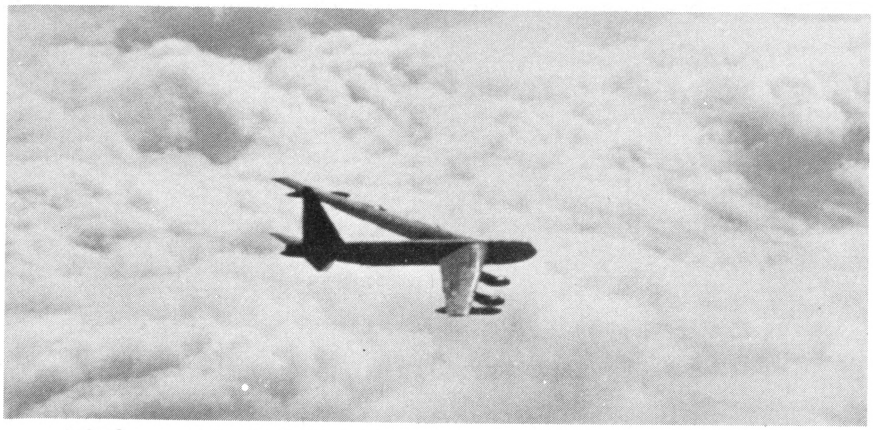
to increase the number of conventional bombs that could be carried internally, a requirement arising from experience in Viet Nam where the Stratofortress was often used for saturation bombing. The "Big Belly" modification enables a maximum bomb load of approximately 70,000 lb. to be carried—greater than any other B-52 variant.

Tail guns

While Doug continued with the pre-flight external inspection I took the opportunity of visiting Bob Phillips in his gun compartment. B-52D tail armament consists of 4 × 0.5-in. guns mounted in a Bosch Arma MD-9 rear turret, with radar or visual aiming. The ability to acquire a target visually is a great advantage, particularly in an ECM environment when identification friend or foe (IFF) systems are none too reliable. In post B-52D models, inclusive, the gunner sits forward in the crew compartment and aims using radar guidance. A television link was provided initially but removed after a short period of in-service use due to problems with the system.

Asked how gunners of these later marks differentiated between friend and foe, Lt.-Col. Feiherty, a S.E. Asia veteran with over 400 Stratofortress sorties over Viet Nam to his credit, told me that "if an unidentified aircraft was still on (his) tail after pulling evasive manoeuvres (he) felt it had no right to be there"—and it suffered the conse-

The crew of Stratofortress 56-0585 (left to right): *Capt. Jim Scheidman, pilot; Capt. Tom Eisenhut, EWO; Capt. Doug Smith, co-pilot; Capt. Bob Holey, instructor pilot; Sgt. Bob Phillips, gunner; 2nd Lt. Patrick Goon, navigator; and Major Forrest McGill, radar navigator/bombardier. Note the height of the port outrigger wheel from the ground; it touched as we were taking off!*



Left: *Our companion B-52D 56-0677 over solid cloud near the French coast.* Right: *Capt. Jim Scheidman, pilot of 56-0585, at a rare quiet period during the sortie. The radar CRT can be seen immediately in front of the control horn*

Stratofortress sortie . . .

quences! Tail guns may seem "old hat" but it is worth noting that recent photographs show the Tupolev Tu-26 "Backfire B" sporting them.

As I climbed down from the gunner's station, Doug was completing the external check. Back aboard, I set about strapping on my parachute. This had to be done while sitting in the bunk seat. It was not an easy task and I was grateful for Doug's help. Feeling like a trussed-up chicken, I donned my helmet and connected up my oxygen and mic/tel lead.

No. 4 engine was started at 08.04 hr., followed almost immediately by the other seven. Although 40 minutes prior to our take-off time, it is standard procedure with SAC to allow time for any fault diagnosis and correction after start-up. Having closed the bomb-bay doors, Jim Scheidman confirmed that Stratofortress 56-0585 was ready to taxi. He then requested and was given taxi clearance, at 08.11 hr. As we taxied along the runway, Jim and Bob Holey continued with the pre-flight check lists.

Their incantations were interrupted to acknowledge a warning from Air Traffic Control (ATC) to "use caution, there are rabbits on the runway". A unique feature of the Stratofortress is the ability to skew the undercarriage. This enables the aircraft to yaw into wind while the wheels stay aligned parallel to the runway centre-line. When this control was checked as we taxied, the nose swung sharply, several degrees off the runway centre-line. It was a strange experience to be taxi-ing straight down the runway while crabbing sideways.

Bob Holey commented on the narrowness of the runway and advised Jim to allow for visual illusion during approach. Being familiar with much wider runways and using the width as a visual cue for height, touch-down would occur earlier than expected.

At precisely 08.45 hr. the brakes were released and our 360,000 lb. of aircraft thundered down the runway. It took 14 seconds and 6,200 ft. of the 9,500-ft. runway to reach our rotation speed of 103 kt. and we unstuck at 140 kt. To minimise noise we took off in dry power—that is, without water injection—hence the relatively light take-off weight. Maximum gross weight of a B-52D is approximately 500,000 lb. In spite of using dry thrust the noise level during take-off was very high. This was when I appreciated the extra noise-absorbent pads in my helmet.

For safety, the take-off interval was 1 min., a factor of four greater than the SAC "rapid response" time. Our call-sign for the mission was "Heath 95" and that of 56-0677, "Heath 50". The undercarriage was retracted smartly after take-off, followed a couple of minutes later by the flaps. Ever aware of the need for favourable public relations, Jim performed a noise-abatement climb-out. After a steady climb we levelled out at FL 240 (24,000 ft.) with "Heath 50" approximately 3 miles in trail.

In-flight refuelling

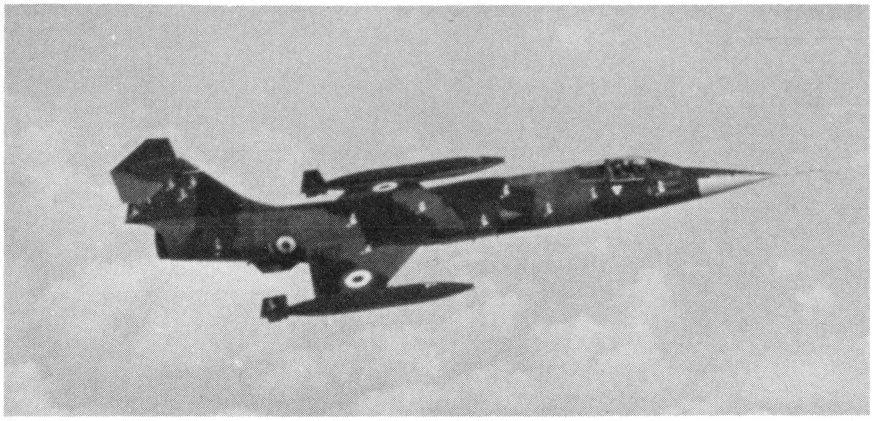
On reaching North Wales, we retraced our route and prepared to rendezvous with a pair of Boeing KC-135 Stratotankers over Fairford, Gloucestershire. Refuelling checks were completed in good time and our tanker came into view directly ahead and 2,000 ft. above. The two KC-135s, call-signs "Moke 01" and "Moke 02", were piloted by Capt. William H. Cope and Capt. Doran A. Archulepa. Both aircraft were on TDY at R.A.F. Mildenhall from Beale AFB, California.

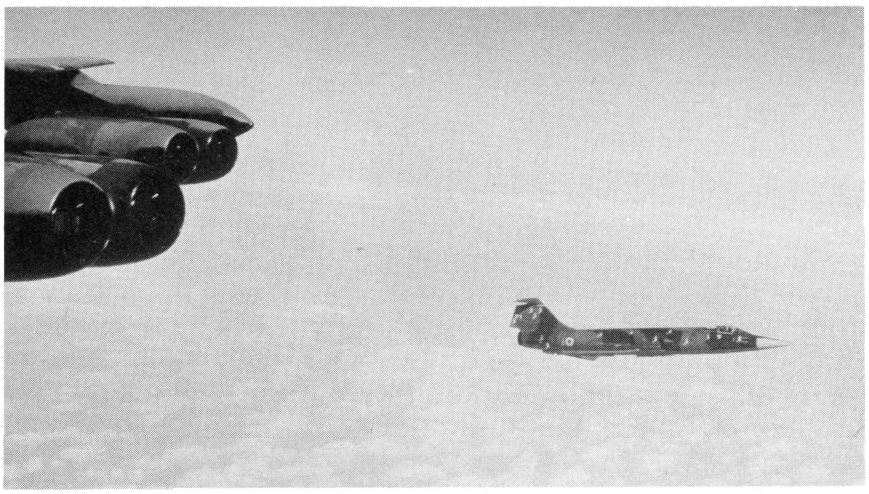
As Jim opened up the throttles, to close on the KC-135, the boom operator ("Boomer") reported a snag. He was unable to lower the boom. Because of our dry take-off and light weight we were committed to abort the sortie unless the boom could be freed. Unfortunately the tanker refuelling "Heath 50" did not carry sufficient fuel to enable both B-52s to complete the mission. While the boomer unsuccessfully attempted to release the boom we formated on the tanker in the refuelling position. Jim then obligingly broke formation and flew over to "Heath 50" which was refuelling a couple of miles to starboard. I had just taken photographs of the coupled Stratotanker and Stratofortress when our tanker informed us that the boom had been released and was ready for business.

When the KC-135 had gently rolled out on to the scheduled heading we reformated at FL 260. This was assisted by visual aids on the KC-135, including a yellow reference line along the centre of the fuselage and an array of lights near the nose. The lights indicate whether the receiver is too high, low, forward or aft. Speed during refuelling was 290 kt. indicated (I.A.S.) and 85,000 lb. of fuel was transferred at a rate of 6,000 lb./min. The B-52D refuelling receptacle is on the fuselage centre-line just behind the cockpit glazing. Coupling of the refuelling nozzle and receptacle is the responsibility of the "boomer" who flies the nozzle into position.

Considering the size of the Stratofortress and its proximity to the KC-135 (about 20 ft.), the refuelling exercise was deceptively easy. This was no doubt aided by a remarkable lack of turbulence. However, we only appeared to descend a couple of feet, after the boom had been extracted and we hit the Stratotanker's wake. It was like sitting in a rowing boat on a choppy sea. Jim then had his hands full keeping station, using large control horn movements. Our refuelling route took us from overhead Fairford to Lands End, which was reached at 10.20 hr. His work complete, our KC-135 Stratotanker peeled off to port and we descended to FL 250, on heading 105 for France.

On entering French airspace we had another unpleasant surprise. Paris ATC refused permission to proceed with our mission and instructed us to head back into U.K. airspace. There followed some very polite discussion with the ATC authorities. Eventually we were granted permission to proceed and we per-





Above: *Over Italy the B-52s were intercepted by several waves of Italian A.F. F-104S Starfighters. The last "attack" came just as the bombers recrossed the French border at 32,000 ft. from this F-104 which was liberally stencilled with witches on broomsticks.* Right: *The Italian fighter later formated off our port wingtip*

formed a 180-deg. turn to put us back on course. Apparently the individual concerned in Paris ATC had not received notification of our flight plan.

At 12.00 hr. we were over France at FL 360, Mach 0.8 and on course for Italy. Lunch consisted of a most agreeable selection of sandwiches, fruit, cake and drinks. For longer flights, particularly in cold climates, the B-52D has a rather basic facility for heating food. Apart from the high noise level, even at cruise power, the environment on the flight deck was comfortable. Temperatures in the various crew compartments varied and the pilots were required to make several adjustments to the temperature control throughout the flight.

Fighter attacks

ECM was switched on at 12.20 hr. after a coded transmission to ground radar. Minutes later, as if on cue, two aircraft were detected on our radar warning receiver (RWR). They were "locked-on" in our 6 o'clock position and closing. Their radar lock was broken when Tom Eisenhut (EWO) dispensed some chaff. To quote Tom, "That chaff sure tears them up". The fighters materialised again and were identified as three French A.F. Dassault Mirage F 1Cs.

The first warning of their reappearance came from "Heath 50" who was trailing some 5 miles behind us. My headset was filled with calls strongly reminiscent of a World War II dogfight: ". . . fighter coming back in, see below number two"; "Number one, bandits at 6 o'clock"; ". . . one coming right over the top from ahead"; ". . . bandits at your 5 o'clock and 7 o'clock, probably Mirages"; "Number one, you have three bandits on your tail". The warnings were mainly from "Heath 50" and Bob Phillips. After giving us a thorough "beating up", two of the Mirages broke off to starboard. The third engaged reheat and accelerated away in a series of barrel rolls.

In addition to chaff, the B-52D carries a modern suite of ECM equipment. An RWR gives audio and visual outputs to both the gunner and EWO. The audio warning may be used to differentiate between threats—airborne, SAM and so on—while the visual display also indicates the direction of the threat. To help hide the Stratofortress electronically, the aircraft carries a countermeasures set which automatically jams enemy radar signals. Directly in front of the EWO is a 12-in. square cathode ray tube (CRT). This displays the output from a panoramic frequency receiver and allows the EWO to analyse signals detected in a radar environment. One of Tom Eisenhut's main tasks was to record the data presented on the CRT, which appeared to me as a meaningless pattern of wave forms. A constraint on defensive measures was the temporary prohibition on evasive manoeuvres; this was decreed during the pre-flight briefing, presumably for safety reasons.

Shortly after the Mirages departed, we entered Italian airspace. I sat alongside Bob Phillips while we overflew a SAM site, listening to and watching the RWR signals. I was still with Tom when Bob Phillips called "three Starfighters at our 6 o'clock". As there were no indications on the RWR, it was assumed that they had been vectored on to us by ground control. If so, our counter-measures set wasn't pulling its weight. For security reasons, the standard operating procedure is to plan a datum speed prior to flight and once airborne all speeds are referenced to it. Presumably this helps confuse ground defences who might overhear speed change transmissions.

When Bob Phillips in the tail gun position called "Starfighters at our 3 o'clock", I made my way forward and took photographs through the side windows. These were about 12-in. square, set deep into the fuselage wall and angled—not the best photographic optics.

We were intercepted by four more waves of Italian A.F. F-104S Starfighters before reaching the Gulf of Taranto, at the "boot of Italy". They came in formations of three and singletons and apparently used both ground control vectoring and their own acquisition radars. We reached the "boot" at 14.30 hr. and turned to retrace our route. During the manoeuvre to set course home I climbed down to the lower level. The navigators' compartment was dark in contrast with the upper deck. It was illuminated by a single angle-poise lamp and the glow from radar scopes and low-intensity instrument lighting. Looking over Pat Goon's shoulder, the coastline of Italy around the Gulf of Taranto was easily identified on one of the radar displays.

Passing through the EWO's compartment on my way back to the flight deck, I could see the radar return from "Heath 50" on the RWR as it manoeuvred ahead. We rolled out on the return leg at FL 310 with "Heath 50" approximately 5 miles ahead. For mutual ECM support the optimum separation distance is 1-2 miles. However, to ease the task of ATC we flew a loose formation.

Ten minutes into our return journey Tom Eisenhut called a warning "tail lock on—looks like a SAM". The

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Stratofortress sortie . . .

unusual RWR signal was soon identified as a fighter but was not acquired visually. Visibility was deteriorating slightly and a thin haze was making visual acquisition difficult. A "bogey" was then spotted in our 7 o'clock position and high but didn't attack or show a return on the RWR. The efficiency of our counter-measures was apparent from the the large number of ground radar stations who reported that they were "blinded" by our ECM.

"Heath 50" streamed condensation trails behind its eight engines which were mixed by the strong wingtip vortices, giving visible signs of the wake. We occasionally felt the wake turbulence, even at our separation distance of 5 miles—a demonstration, if one were needed, of the necessity for adequate spacing during landing, particularly after large heavy aircraft.

The radar return from the lead aircraft was clearly visible on the pilot's radar screen. This is a 6-in. CRT in the centre of his instrument panel and can be used in two modes. In low-level flight it is used for terrain avoidance but for the type of high-level mission we were flying it was selected to an air mode. "Heath 50" appeared as a bright dot just inside a circular arc depicting 6 miles range. As I watched the screen a second dot appeared. It originated from "Heath 50" and was identical, to my untrained eye, in size and intensity. I was told that it was chaff which had been ejected from the lead aircraft.

During this period of fighter inactivity, I was given a demonstration of the B-52D's handling characteristics. Without autostabilisation the Stratofortress is very sensitive in pitch and it is quite difficult to hold the altitude within ± 100 ft. without considerable experience. As might be expected with such a large aircraft, there were other inertia effects. Particularly apparent was the delay in acceleration after increasing thrust. Roll inertia was large and again there was a significant lag between control application and aircraft response.

The final attack on our Stratofortresses came just before we left Italian airspace. An Italian A.F. Starfighter intercepted from astern and then formated off our port wingtip. It was covered from nose to tail in stencils depicting a witch riding on a broomstick—signifying, I believe, a weapons trials aircraft.

As we flew west the cloud steadily increased in density until by the time we reached U.K. airspace it was a solid layer. After closing to within half a mile or so of "Heath 50", for photographs, we began our descent to R.A.F. Upper Heyford. The radar sweep frequency increased noticeably and anti-icing was selected for a few minutes as a precaution.

We entered cloud at FL 90, about a mile behind the lead aircraft, and London Military Radar transferred control to Cotswold Radar. While we were in the final stage of our descent "Heath 50" appeared through a break in the cloud, looking uncomfortably close. However, ground control gave us the reassurance that we were both on their radar, spaced at half a mile with 1,000 ft. vertical separation.

We entered rain at 5,500 ft. and finally broke through the Oxfordshire overcast at 3,000 ft. Flaps were lowered at 156 kt. and the airbrakes opened to 4 deg. Then all that was required for our landing was the undercarriage, which was lowered at 150 kt. As we turned on to the approach for runway 27, ILS approach radar provided wind data, informing us that it was gusting up to 22 kt. This information enabled Bob Holey to set the appropriate undercarriage crab prealignment to allow for the cross-wind.

Runway 27 was sighted through the murk at 1,600 ft. and Jim Scheidman was kept busy holding our heading. This required continual rudder inputs and he treaded the rudder pedals in response to the large gusts as we descended along the glide-slope. We touched down at 18.45 hr., giving a total flight time of 10 hours, with a fuel load remaining of approximately 50,000 lb. The deceleration due to the brake parachute deployment was almost unnoticeable. In fact, if Bob Phillips hadn't called "door open, 'chute deployed", I wouldn't have been aware of it.

On arrival at the "pan" Jim kept an engine running so that the mechanics could check an alternator which had failed during the return leg of our sortie. I'm not sure what action the ground crew took but it was back on line within 5 minutes.

Still highly effective

For a 24-year-old, the B-52D Stratofortress still has an important role alongside its SAC contemporaries. Due largely to its modern ECM fit, the aircraft is able to operate effectively and with a multi-role capability in many of the predicted combat scenarios, some of which have been demonstrated recently during their U.K. deployments.

These B-52D deployments have included sea surveillance, aerial minelaying and participation in several NATO exercises. Add to this the Stratofortress's ability to carry nuclear stores, for which it was originally designed, and its versatility is apparent. It is not surprising, therefore, to hear that the 'D model Stratofortress is to have yet another update to prolong its useful life.

Acknowledgments: Thanks are due to Capt. Jim Scheidman and his crew for their hospitality and Lt.-Col. Alan G. Schreihofer and Lt. Nei of the Offices of Information for making my flight possible.

Airlines of the World

by GÜNTER G. ENDRES

EXECUTIVE EXPRESS

Executive Express (Flight Code EX)

Executive Express was formed in 1974 by the Bron Organisation to operate a company aircraft in pursuance of its European interests in the music industry. Initially only a small amount of charter work was done but the executive market expanded rapidly and the company today operates a modern fleet of twin-engined aircraft ranging from the Cessna Golden Eagle to the turbine-powered Beechcraft Super King Air. Operations include *ad hoc* and contract charter flights for passengers and freight, nightly newspaper delivery and oil-related charter work. Aircraft are based at Luton, Aberdeen, Bristol and Cardiff.

Since March 1980 Executive Express has also been operating jointly with Cabair a daily scheduled Luton–Brussels–Luton service under the title of Euroflite.

Head Office: Hangar 62, Luton Airport, Luton, Bedfordshire LU2 9NB, England. Telephone: (0582) 24232. Telex: 826873.

Reg'n.	*Type*	*c/n.*	*Previous identity*
G-BBIJ	Cessna 421B Golden Eagle	0432	N41073
G-BBSV	Cessna 421B Golden Eagle	0548	
G-BDZU	Cessna 421C Golden Eagle	0094	N98791
G-BEHR	Beechcraft 200 Super King Air	BB-230	
G-BELV	Cessna 404 Titan	0061	
G-BEMX	Cessna 404 Titan	0063	
G-BFVZ	Beechcraft 200 Super King Air	BB-417	
G-BFWI	Beechcraft 200 Super King Air	BB-428	
G-BRIT	Cessna 421C Golden Eagle	0446	N6713C
G-BRON	Beechcraft 200 Super King Air	BB-349	G-BFEA
G-CNSI	Beechcraft 200 Super King Air	BB-641	
G-EXEX	Cessna 404 Titan	0037	SE-GZF
G-WTVA	Cessna 404 Titan	0056	N5438G
G-WTVE	Cessna 404 Titan	0220	N88682

Based at Luton, Executive Express have a fleet of fourteen twin-engined aircraft, including Cessna 404 Titan G-BEMX

Auxiair (Flight code BS)

Compagnie Auxiair operates out of two bases at Lyon-Satolas and Aubenas-Vals-Lanas, both of which are connected with twice-daily passenger services. Other schedules link Lyon with Nevers, and on a seasonal basis with the winter sports centre of L'Alpe d'Huez. Since its foundation in 1975, Auxiair has been operating extensively in the French Alps, carrying out scenic flights and glacier landings from altiports at Megéve and Meribel. Up to three passengers plus a guide can be carried in the single-engined Jodels to the glaciers du Ruitor, Bellecôte, la Grande-Motte, St. Sorlin and Lombard, and Alpine tours include Mont Blanc, the valleys of Megéve, Chamonix, Meribel and others. Helicopter services and air taxi flights within Europe complete the company's varied activities.

Head Office: Aéroport de Lyon-Satolas, B.P.509, 69125 Lyon-Satolas, France. Telephone: (78) 71.99.99. Telex: 330 312.

Reg'n.	*Type*	*c/n.*	*Previous identity*
F-BJQX	Jodel D.140B Mousquetaire	86	
F-BNIU	Jodel D.140E Mousquetaire	181	
F-BOPK	Jodel D.140R Abeille	523	
F-BSTS	Beechcraft 65 Queen Air A80	LD-166	D-ILGY
F-BXLI	Partenavia P.68B Victor	43	
F-BXPG	Westland SA.341G Gazelle	WA.1073	G-BAZL
F-GCJP	Partenavia P.68B Victor	190	

UGANDA AIRLINES CORPORATION

Uganda Airlines (Flight code IV)

Uganda Airlines Corporation, the country's national airline, was formed in May 1976 and operates scheduled passenger and cargo services to a number of domestic points together with regional routes to Kenya and Tanzania. An international service to London-Gatwick was added in May this year and is currently operated twice weekly, via Brussels on the outward journey and via Rome on the return trip. Uganda Airlines also makes regular freight flights to Europe, and offers air taxi and charter flights and tourist excursions to the East African game parks.

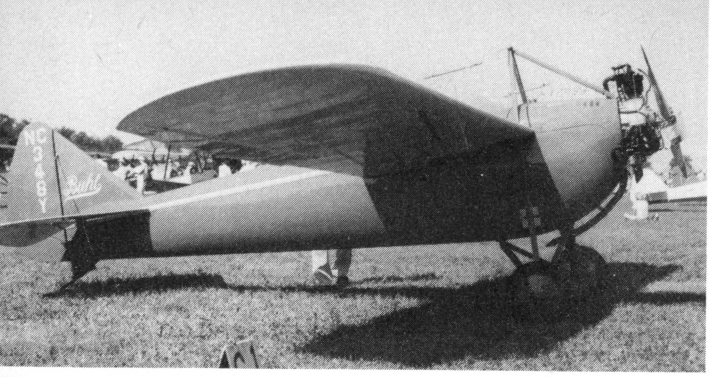
Uganda Aviation Services, formed by the Government in 1965, was absorbed by the airline in 1977.

Head Office: P.O. Box 523, Kampala, Uganda. Telephone: 32990. Telex: 61039.

Reg'n.	*Type*	*c/n.*	*Previous identity*
5X-UAC	Boeing 707-351C*	18747	VR-HHB
5X-UAO	Fokker F.27-600 Friendship	10571	SU-AZH
5X-UAP	Fokker F.27-600 Friendship	10576	SU-AZZ
5X-UAS	Britten-Norman BN-2A Mk. III Trislander	373	G-BCJV
5X-UCF	Lockheed L.100-30 Hercules	4610	N108AK
5X-UDC	Britten-Norman BN-2A Mk. III Trislander	1001	G-BCNK
5X-UUY	Piper PA-28-235 Cherokee	28-10606	
5X-UVI	Piper PA-32-300 Cherokee Six	32-40320	5Y-AGI
5X-UVL	de Havilland Canada DHC-6 Twin Otter	157	
5X-UVN	Cessna U206 Stationair 6	02646	
5X-UWO	Cessna 402B	0838	N3964C
5X-UWS	Beechcraft A100 King Air	B-188	N545GM
5X-UWT	Beechcraft A100 King Air	B-197	N74KA

*Named "The Flying Crane".

Left: *Auxiair's Partenavia P.68B Victor F-GCJP at Aubenas on its twice-daily service from Lyon (Photo: Geoffrey P. Jones).* Right: *One of Uganda Airlines' Fokker Friendship 600s, 5X-UAP, at Kilimanjaro International Airport, Tanzania (Photo: D. J. Hindle via G. G. Endres)*



Left: *Winner of the Grand Champion Antique award for 1980 was Buhl LA-1 Bullpup NC348Y. Owned by Dan F. Neuman of Minneapolis, it is powered by a three-cylinder Szekely radial.* Right: *Beautiful EAA-built replica of the Laird Super Solution, NR12048. Matty Laird designed the original Solution to beat the Travelair Mystery Ship in races. The Super Solution was flown by Jimmy Doolittle to win the 1931 Bendix Trophy. Both Laird and Doolittle were at Oshkosh this year, and Laird has assisted in advising on the construction of the Super Solution*

Oshkosh or Bust

Report and photos by J. M. G. GRADIDGE

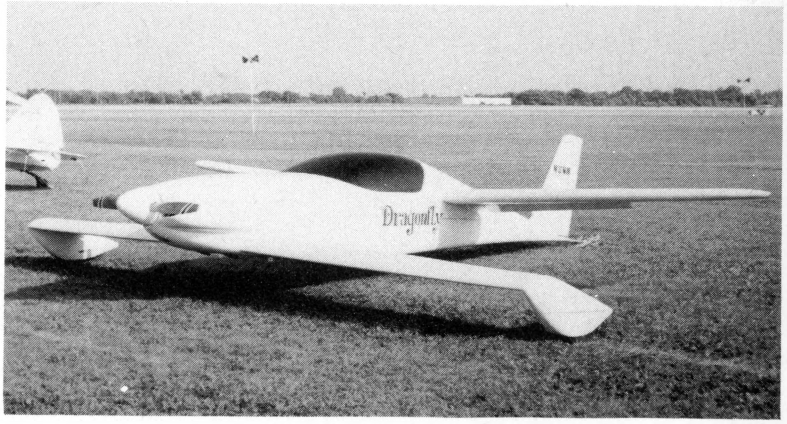
BUT FOR the alcohol still run by "Mother Earth" it would have been far from obvious that there was a fuel shortage, or that prices are rising, at Oshkosh this year. The 1980 show, held by the U.S.A.'s Experimental Aircraft Association from 2nd to 9th August at Wittman Field, near the town of Oshkosh in northern Wisconsin, broke almost all records.

There were slightly fewer Antiques and Warbirds, but the numbers in other classes, particularly the Ultra-lights, were all up and more than 1,500 show planes registered during the week. The number of people passing through the gates approached the half-million mark (although the author was counted ten times!), but a quarter of a million in one day takes some beating.

There were many memorable moments: the sight of three B-17G Fortresses in formation; a trio of trimotors together; the smell of newly sprayed paint from the replica of the Laird Super Solution (completed just in time for the show); and the field awash after 2½ in. of rain one night, which gave taxi-ing landplanes a bow wave, or in one case a mud-bath. Interesting too was the sight of a pilot running alongside his VariEze with his hand on the throttle, taxi-ing over wet ground and so keeping the aircraft light enough not to bog down. The show was also attended by a flying-boat, the Van Dine Merganser, but this was trailered in.

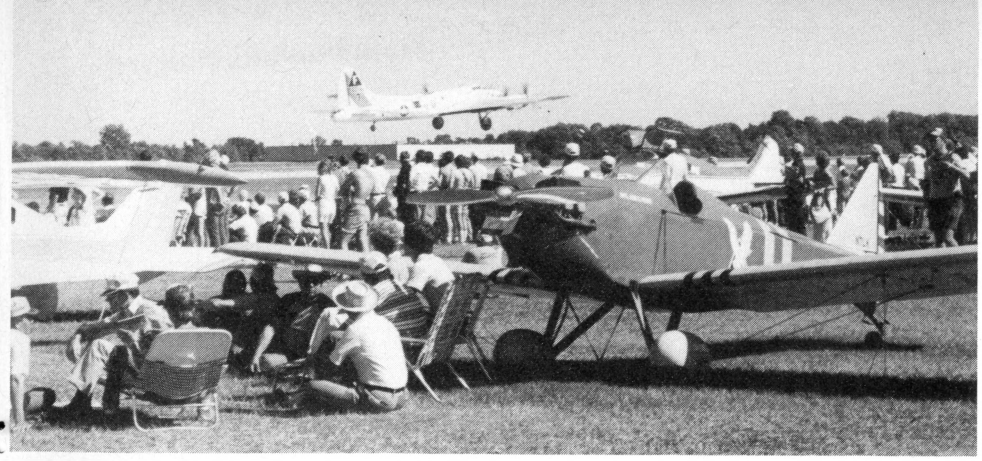
Unfortunately there were too many accidents this year and a VariEze ran out of fuel two miles out on finals, killing the two occupants as it hit a street sign and broke up on impact in

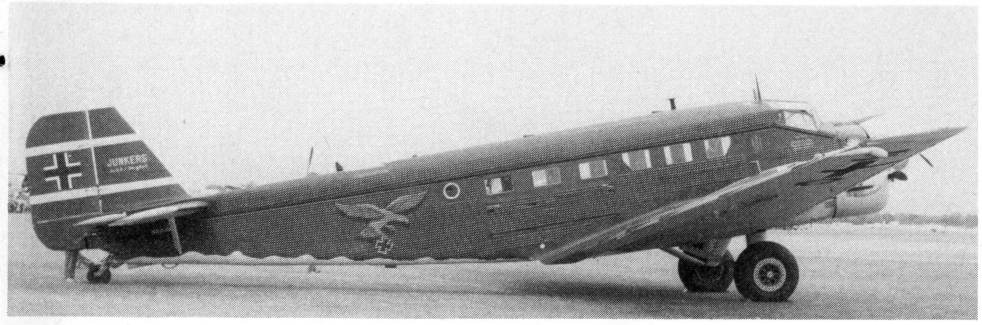
(Continued overleaf)



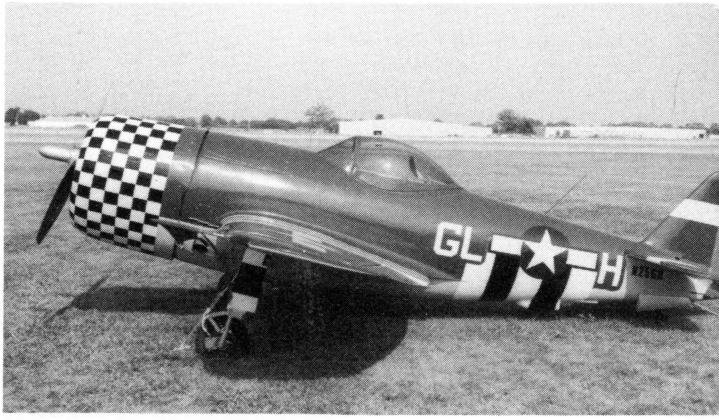
Above Left: *Following the deluge came the flood and Canadian-built Rutan VariEze C-GHYP was one of many to find its feet wet in the morning. A U.S.-built model, N37840, won the Grand Champion award after flying all the way from Alaska.* Right: *Viking Dragonfly N5WN. The Quickie designed by Burt Rutan is a single-seater, but N5WN is a two-seater powered by a 1,600-c.c. Volkswagen and cruises at about 145 m.p.h. It is one of the first home-builts to use carbon-fibre in its construction and won the Outstanding New Design award*

Below Left: *Mace Scorchy N5588N makes use of many parts from a Bede BD-5 but has a tractor engine and tail-dragging undercarriage. Another BD-5 mod. is the Option Acapella with twin-booms, which also came to Oshkosh.* Right: *Van Dine Merganser N5001S, a flying-boat powered by a Revmaster 2100D*



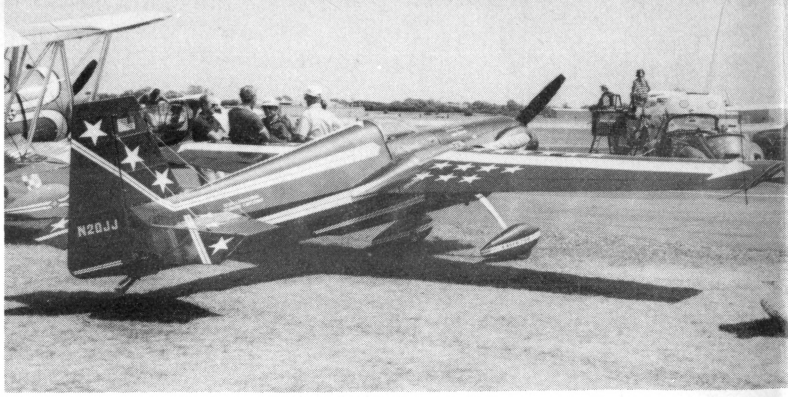


Top: *Boeing B-17G Fortress 85740/N5017N takes off to start the show, with Bowers Flybaby N7LK in the foreground. The B-17 later formated with two others.* Bottom: *Junkers Ju 52/3m N52JU is almost certainly the only airworthy German-built aircraft left, apart from the Swiss A.F. trio. It started life with the* Luftwaffe *and went to DNL post-war to operate on floats as LN-KAF. Later it went to Ecuador as HC-ABS, but was abandoned and overgrown by the jungle until rescued by author Martin Caidin. It then became N130LW but has since become N52JU and has acquired many extras, including four wing guns and a dorsal gun. To dissuade "pursuers" further, smoke generators are attached to the wing engines and to blind them, strobe lights flash out from wing and tail.* Right: *Nostalgic formation flight of Stinson A NC15165, Ford Trimotor 4-AT N7584 of Island Airlines and Martin Caidin's Ju 53/3m N52JU*



Above Left: *The Weedhopper Gipsy shows the trend in ultra-lights. Designed by John Chotia, it has a 25-h.p. Chotia 460 and an empty weight of 165 lb. It is similar in layout to the 1924 Dormoy Bathtub, a replica of which flew in.* Right: *War Aircraft Replicas have a range of ½-scale plans and kits of W.W.II fighters of which the Fw 190 and Corsair are well known. This P-47N, N25GH, is the first Thunderbolt to appear at Oshkosh and is powered by a 100-h.p. Lycoming O-200 driving a two-blade propeller*

Below Left: *Among the antiques was this neat restoration of the Fleet 16B Finch N162V, painted up as RCAF 284.* Right: *New Standard D-31. This is a unique biplane built just before Pearl Harbor, in 1941. N29090, c/n. 100, is owned by P. L. Direnzc and is the last in a long line of biplanes such as the D-25 built for crop-dusting*



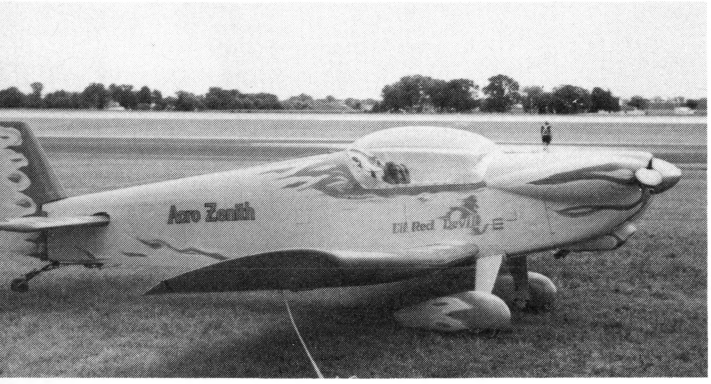
Left: *Grumman TBM-3E N86280, one of three Avengers at the show, is painted in the light/dark-grey scheme used during the earlier stages of the war, when the red bar had not yet been adopted in the U.S. marking.* Right: *Laser 200 N20JJ is based on the Stephens Akro and was to be the mount of Leo Loudenslager in the American aerobatic team*

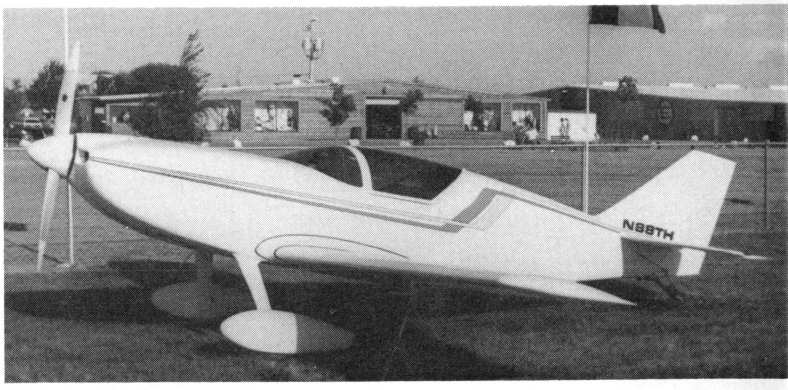
Oshkosh or bust . . .

Oshkosh. Another accident involved a Skyhopper which was stalled on its final turn on to the runway, killing one of two occupants. A North American T-28 lost its nose gear on landing and there were several other minor mishaps. A violent storm destroyed about thirty ultra-lights one night, when the wind swung through 180 deg., and others were damaged.

Fortunately these storms were the exception, and Bryan Allen was able to pedal Gossamer Albatross back and forth along the runway early one morning, in its first public display. Another nostalgic item was the venerable 1928 Ford Trimotor giving 10-dollar joy-rides—and very good value these days for a long circuit and the chance to view the world's largest camp-site from the air.

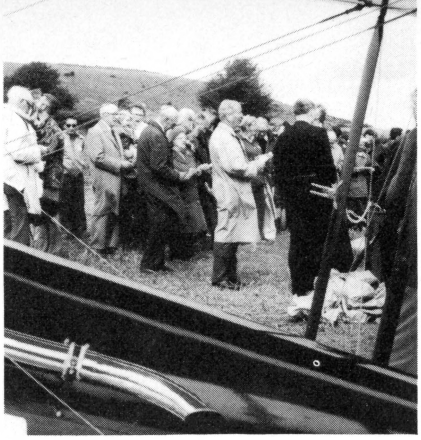
Modern technology has its impact on the home-built scene. The Albatross was not the only type using carbon-fibre. This also helped the Viking Dragonfly, and plastic foam construction used in the VariEze has certainly made home-building easier. Not for nothing was the VariEze area named "Easy Street", for the type outnumbered all others; in fact, there were more than fifty at Oshkosh and another interesting sight was provided by masses of VariEzes lined up nose to nose in their typical praying position (they are safer when tied down as the C. of G. is marginal on the ground). In contrast, the Quickies were disappointingly few; perhaps they are not looked upon as cross-country aircraft but fun planes? In any event, there was no doubt whatsoever about the fun and enthusiasm generated by Oshkosh.





Above Left: *Zenair this year have produced their CH-150 Akro-Zenith for aerobatic training. C-GCGW proved to be very agile, is stressed to ± 12g and has a 115-h.p. Lycoming O-200. A.u.w. is 1,150 lb., top speed 170 m.p.h. and range 650 miles.* Right: *One of the stars of the show was Hamilton Glassair N88TH, a side-by-side two-seater made by Stoddard Hamilton Aircraft Inc. Already in production in kit form, its 115-h.p. Lycoming O-235 gives a cruising speed of 200 m.p.h.*

Below Left: *Aero Super 145 N145SA owned by Jon Svenson of Waterloo, Iowa, won a "Unique Classic" award. A Czech design, it once resided at Elstree as G-ASYY.* Right: *Mudry CAP-21 F-WZCH is a brand-new aerobatic aircraft which was to be used by Eric Muller and Louis Pena at the World Aerobatic Championships due to follow the EAA Convention. It appears to differ considerably from the earlier CAP-20, with a new fuselage, wing and undercarriage*



Left: *Open-air service at Seven Barrows seen through the struts of Gipsy Moth G-ABEV. Right of centre in a white mac is John Cunningham.* Right: *The R.A.E.'s Comet XV814 flies past in salute (Author's photos)*

Salute to de Havilland

by DON CONWAY

ON WEDNESDAY, 10th September members of the de Havilland Moth Club and their flying machines gathered at Seven Barrows, Hants., on Lord Porchester's estate by the A34 to remember the late Sir Geoffrey de Havilland, born 1882. It was seventy years ago to the day that the young Geoffrey de Havilland, assisted by Frank Hearle, made his first flight in his home-made aeroplane at Seven Barrows, where a memorial stone, engraved to this effect, was unveiled by Lord Porchester in August 1966.

The rough 800-yard burnt stubble landing strip, whipped by 30-knot gusts, did not deter a good selection of D.H. aeroplanes. Gipsy Moth G-ABEV was parked with Tiger Moths T5424 (G-AJOA), T8191 from R.N.A.S. Yeovilton, G-AIRI, G-ANZU, old faithful from the Tiger Club G-ACDC, G-ACDJ, G-AJHU, G-AZGZ and French-owned Tiger F-BGGS which had flown from Rheims the previous day via Popham and is reputed to be the only airworthy (once owned by Sheila Scott) and G-AOIR, Chipmunks WB652, G-APPA, WP808 (G-BDEU), Leopard Moths G-ACLL from Bodmin and G-ACMN, and Beaver XP820.

Shortly after midday an open-air memorial service was held alongside the aircraft, during which G/Capt. John Cunningham, the D.H. Aircraft Company's Chief Test Pilot since 1946, read a passage from Sir Geoffrey's book *Sky Fever*. Later D.H. aircraft flew low over in salute, these being the R.A.E.'s Comet XV814, Royal Navy Devon XJ347 and Heron XR445, from Lee-on-Solent, and Army Air Corps Beaver XP820. The Comet's appearance was doubly fitting because, apart from being the world's first jet airliner, this particular aircraft is based at Farnborough where Geoffrey de Havilland acted as chief designer and test pilot at the Royal Aircraft Factory in World War I. Later, at the end of 1920, he formed the D.H. Aircraft Company.

Thanks must go to de Havilland Moth Club Secretary Stuart McKay and all those who made the event possible.

Top Left: *Helping hand over the stubble for the Royal Navy's Tiger Moth T8191.* Right: *Tiger Moth T5424 (G-AJOA) about to touch down.* Bottom Left: *Army Air Corps Beaver XP820.* Right: *Chipmunk WP808 (G-BDEU) arrives over the hedge*

Luftwaffe PR in World War II

Part 1: Target folders; German techniques; what they achieved

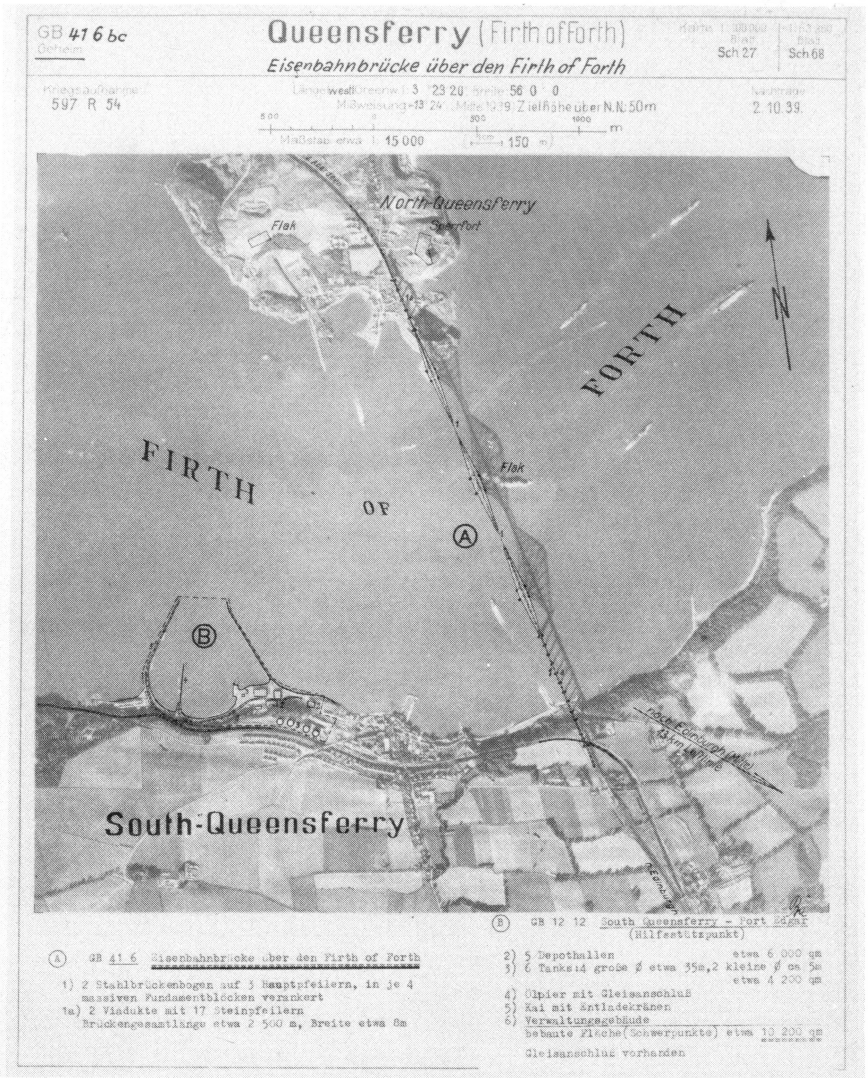
by CHRISTOPHER R. ELLIOTT

THERE CAME into my hands in the middle 1960s from a source in Belgium a selection of *Luftwaffe* target folders—briefing sheets, photographs and maps—first captured at the end of 1944 at Chièvres airfield, some 12 miles north-west of Mons, which in 1940 housed both German and Italian squadrons and was attacked three times by Allied aircraft in 1943 and nine times in 1944. The folders embraced United Kingdom targets of every description and in some cases were clearly based on intelligence gathered well before the outbreak of World War II.

It was not until the early 1970s, however, that much more information was released through the Public Records Office on German photo-reconnaissance and photo-intelligence. What happened was that in 1945, when the remnants of the *Luftwaffe* were being combed for intelligence of every description, two officers (R.A.F. and Army) of the Allied Control Interpretation Unit saw about thirty key *Luftwaffe* photo experts and examined a large amount of captured documentation. U.S.A.A.F. experts also contributed to the report.

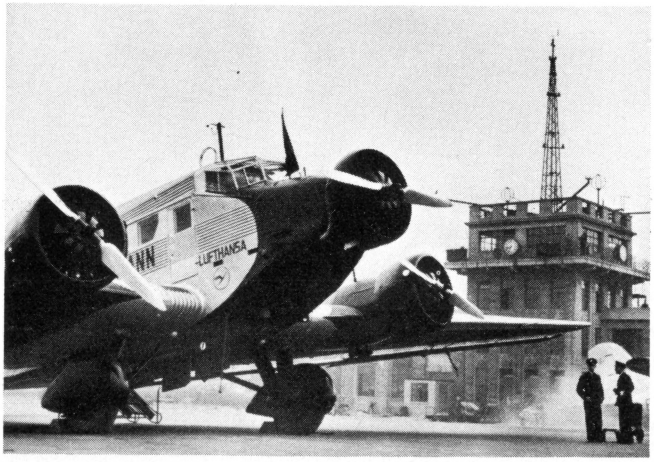
Extensive study showed that, by the time the Battle of Britain was over, what could have been the finest photo-reconnaissance organisation in the world was bedevilled by problems that never, fortunately, were allowed to blind the Allies working in the same field.

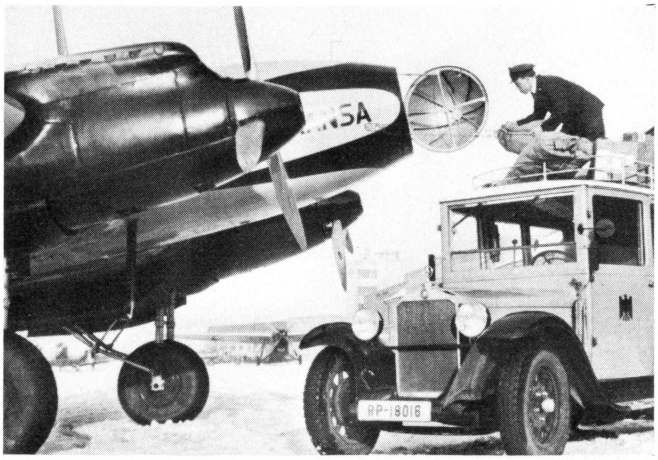
At German Air Ministry level photographic reconnaissance was the concern of two different departments. But

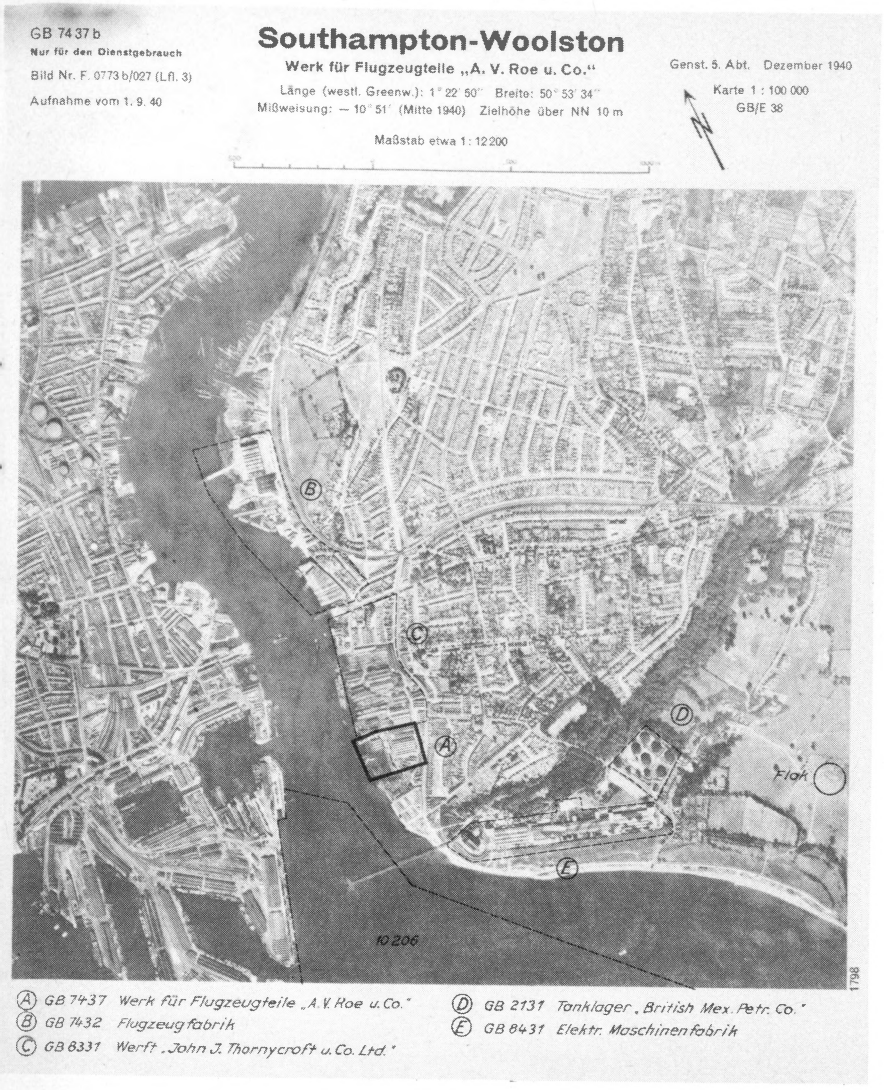

GB 41 6 bc
Queensferry (Firth of Forth)
Eisenbahnbrücke über den Firth of Forth
Sch 27
Sch 68
597 R 54
2. 10. 39.
Maßstab etwa 1: 15 000
North Queensferry
Flak
FORTH
FIRTH OF
Flak
South-Queensferry
N
GB 12 12 South Queensferry - Port Edgar
(Hilfsstützpunkt)
GB 41 6 Eisenbahnbrücke über den Firth of Forth
1) 2 Stahlbrückenbogen auf 3 Hauptpfeilern, in je 4 massiven Fundamentblöcken verankert
1a) 2 Viadukte mit 17 Steinpfeilern
Brückengesamtlänge etwa 2 500 m, Breite etwa 8m
2) 5 Depothallen etwa 6 000 qm
3) 6 Tanks: 4 große ⌀ etwa 35m, 2 kleine ⌀ ca 5m etwa 4 200 qm
4) Molpier mit Gleisanschluß
5) Kai mit Entladekränen
6) Verwaltungsgebäude
bebaute Fläche (Schwerpunkts) etwa 10 200 qm
Gleisanschluß vorhanden

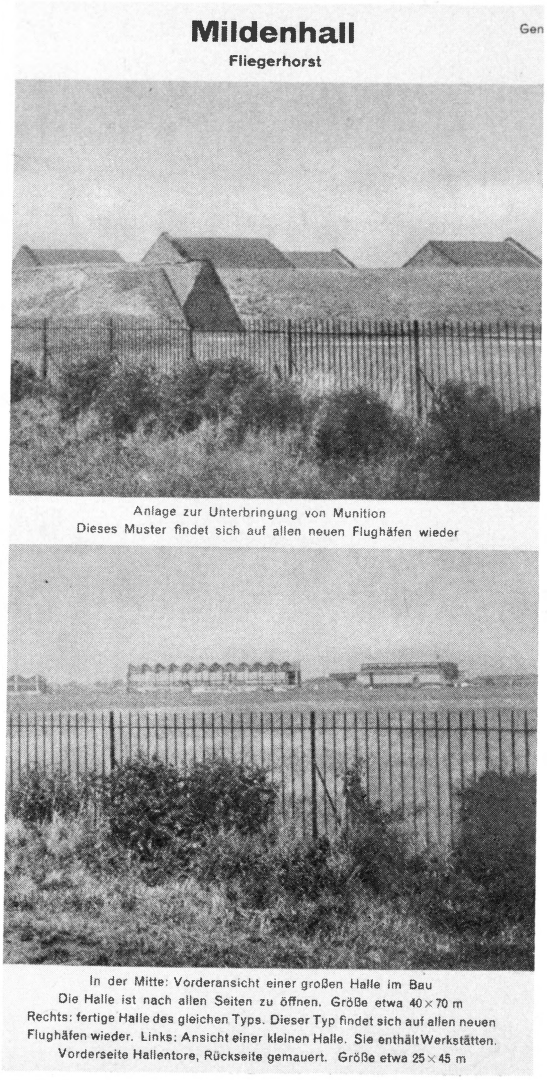
Above: *Ships of the Royal Navy are visible in this reconnaissance photo taken by the* Luftwaffe *on 2nd October 1939, presumably as a preliminary to the attack on the Firth of Forth on 16th October led by Pohle—who, incidentally, lost the cockpit roof of his Junkers Ju 88 over the target through a technical fault*

Below Left: *It was often said that the Junkers Ju 52/3m airliners which frequently visited Croydon carried passengers who operated hand and concealed fixed cameras.* Right: *The well tried Heinkel He 111 passenger and mail carrier turned out to be the* Luftwaffe*'s most active early reconnaissance aircraft (Photos: Lufthansa)*






GB 7437 b
Nur für den Dienstgebrauch
Bild Nr. F. 0773 b/027 (Lfl. 3)
Aufnahme vom 1. 9. 40
Southampton-Woolston
Werk für Flugzeugteile „A. V. Roe u. Co."
Länge (westl. Greenw.): 1° 22' 50" Breite: 50° 53' 34"
Mißweisung: — 10° 51' (Mitte 1940) Zielhöhe über NN 10 m
Maßstab etwa 1: 12200
Genst. 5. Abt. Dezember 1940
Karte 1 : 100 000
GB/E 38
B
C
A
D
E
Flak
10 206
1798
Ⓐ GB 7437 Werk für Flugzeugteile „A.V. Roe u. Co."
Ⓑ GB 7432 Flugzeugfabrik
Ⓒ GB 8331 Werft „John J. Thornycroft u. Co. Ltd."
Ⓓ GB 2131 Tanklager „British Mex. Petr. Co."
Ⓔ GB 8431 Elektr. Maschinenfabrik


Mildenhall
Fliegerhorst
Gen
Anlage zur Unterbringung von Munition
Dieses Muster findet sich auf allen neuen Flughäfen wieder
In der Mitte: Vorderansicht einer großen Halle im Bau
Die Halle ist nach allen Seiten zu öffnen. Größe etwa 40×70 m
Rechts: fertige Halle des gleichen Typs. Dieser Typ findet sich auf allen neuen Flughäfen wieder. Links: Ansicht einer kleinen Halle. Sie enthält Werkstätten. Vorderseite Hallentore, Rückseite gemauert. Größe etwa 25×45 m

Left: *Taken on 1st September 1940, this* Luftwaffe *picture shows the Vickers-Supermarine factory at Southampton/Woolston, where Spitfires were built, but was mistakenly catalogued "A. V. Roe & Co."; an attack on the factory by Messerschmitt Bf 110s of* Erpr. Gr. 210 *on 15th September was beaten off.* Right: *Ground shots of British installations were often included in the* Luftwaffe *target folders. These views from a German document issued in October 1940 show bomb dumps and hangars at R.A.F. Mildenhall, a Bomber Command airfield*

it was the aim of the pioneers of German PR, who had been former PR pilots in W.W.I and in some cases had followed the same profession in their civilian occupations, "to centralise all aspects of aerial photography, both military and civilian, under one department and eventually to form an organisation such as an Air Inspectorate for Aerial Photography". The staffing would be by experts. Such an organisation was considered necessary "in opposition to the political and other interests and ambitions which swayed policy at the German Air Ministry as well as in every other branch of German life".

In decline

At first, under *Generalleutnant* Schimpf, this ideal seemed possible of achievement but from 1940 onwards a decline took place and the German Department of Air Photos was gradually robbed of its powers and responsibilities. Indeed, no one capable of supervising the whole province of air photography/survey was found, nor was a leader of sufficiently high rank and strong personality available who could take the needs of the German PR service to the highest authority and obtain results (as was possible with the R.A.F. and the U.S.A.A.F.).

Incredibly, although specialists *Oberst* Ruef, *Oberstleutnant* Ermel, *Oberstleutnant* Straehle, *Oberstabsingenieur* Siede and others realised "the deplorable state to which German PR had sunk and although the importance of PR as the main and most reliable source of intelligence was generally recognised, a peculiar lack of objective self-criticism existed among members of the staff of the Air Officer for Reconnaissance". But the Allied teams examining prisoners and records in 1945 found many "complaints about the perilous position as far as reconnaissance aircraft were concerned".

Before 1935 the chief German military unit occupied with PR/PI work was the *Hauptbildstelle der Reichswehr* (Main Photo Unit of the Reichswehr), using civilian employees. In order to operate, they had to rely on borrowing from sports flying clubs and also from the flying police. The work, in fact, was undertaken by enthusiasts who believed in the value of air photography for peace and war purposes. Doubtless that is how so many early photographs of the U.K. and other European countries were acquired between the wars.

In 1933 Erhard Milch, who was then head of Lufthansa, accepted the position as deputy to Goering while still retaining his post with the airline. As Goering was still occupied mainly with politics, Milch found himself virtually the head of the German Air Ministry. With an eye on his two parallel interests, Milch first began to expand Lufthansa, itself also a valuable source of aircraft and aircrew for an air force.

With the establishment of the *Luft-*

Luftwaffe PR . . .

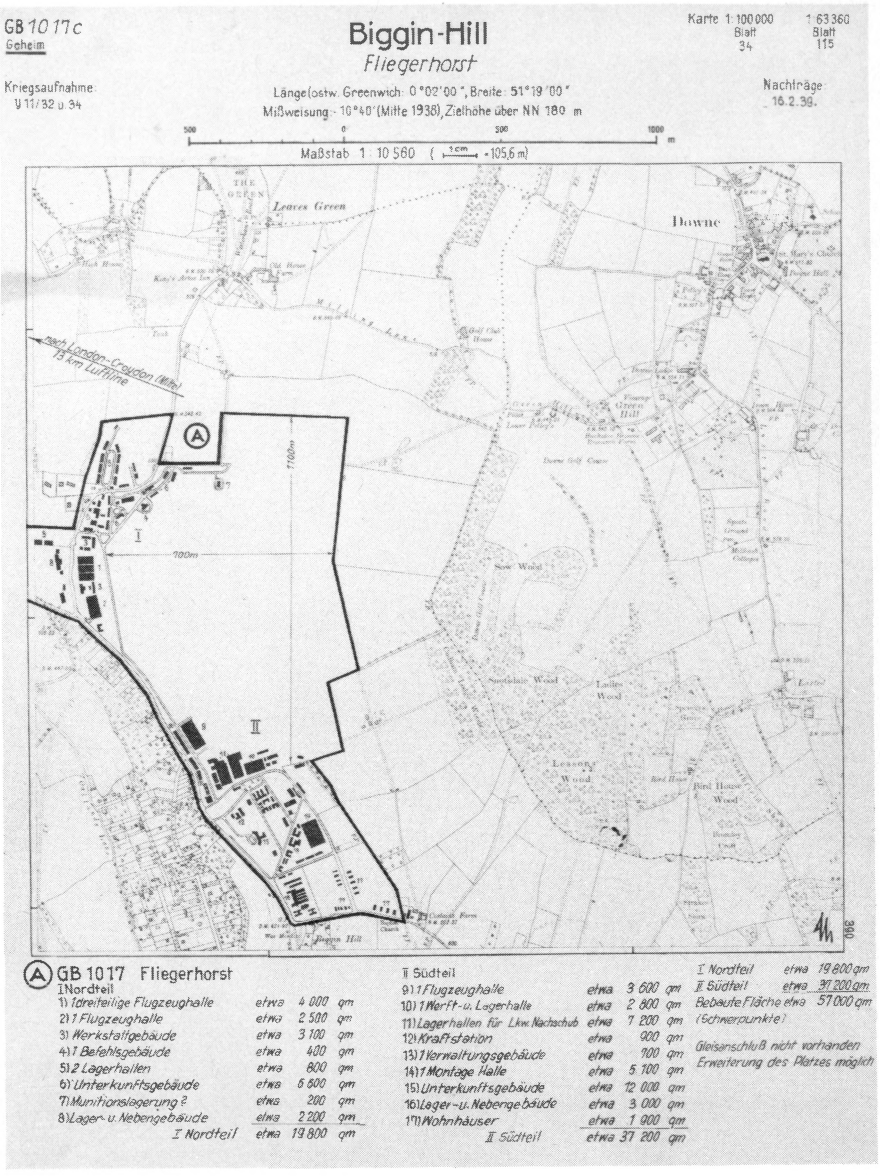
waffe in 1935, however, the Main Photo Unit of the *Reichswehr* was split into three. One cause of the change was the need "to establish a censorship control on all air photos"—a vital requirement for clandestine survey work.

Under *Generalleutnant* Schimpf's direction many steps were taken to unify all aspects of German PR. For example, civilian firms taking air photographs were reduced to two—Hansa Luftbild and Photogrammetrie G.m.b.H. (formerly Consortium Luftbild G.m.b.H., Münich). Schimpf obtained the services of outstanding technical and other experts.

To ensure the full co-operation among the firms producing "survey apparatus", he brought about the amalgamation of Aerotopograph G.m.b.H. and Carl Zeiss, Jena, forming a new company Zeiss-Aerotopograph G.m.b.H.

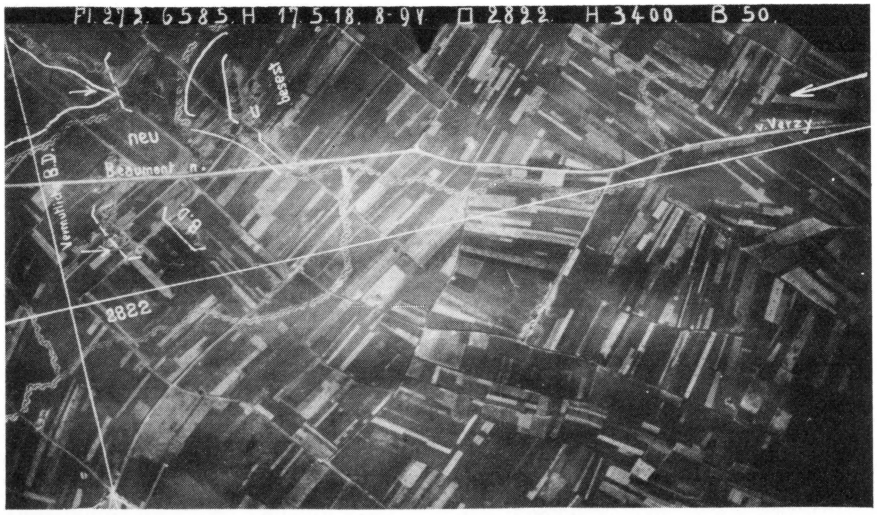
Towards the end of 1939, as Schimpf worked towards unification, he was succeeded by *Oberst* Eicke. Other changes followed in 1940 and from that time a gradual decline took place in German PR.

Meanwhile British PR services were developing quickly on a united basis, and this fact was noted by the German PR experts who cared. All efforts of individual officers to make the responsible German authorities realise what was at stake failed. German PR lacked


GB 10 17c
Geheim
Biggin-Hill
Fliegerhorst
Karte 1:100000 Blatt 34
1:63360 Blatt 115
Kriegsaufnahme: U 11/32 u. 34
Länge (ostw. Greenwich: 0°02'00", Breite: 51°19'00"
Mißweisung: 16°40' (Mitte 1938), Zielhöhe über NN 180 m
Nachträge 16.2.39.
Maßstab 1:10560 (1 cm = 105,6 m)
Leaves Green
Downe
nach London-Croydon (Mitte) 13 km Luftlinie
Keston Hill
Biggin Hill
Southlake Wood
Lodge Wood
Lessons Wood
Bird House Wood
Snow Wood
Golf Club House
Downe Golf Course
I
II
A
GB 1017 Fliegerhorst
I Nordteil
1) 1 dreiteilige Flugzeughalle etwa 4 000 qm
2) 1 Flugzeughalle etwa 2 500 qm
3) Werkstattgebäude etwa 3 100 qm
4) 1 Befehlsgebäude etwa 400 qm
5) 2 Lagerhallen etwa 800 qm
6) Unterkunftsgebäude etwa 6 500 qm
7) Munitionslagerung? etwa 200 qm
8) Lager- u. Nebengebäude etwa 2 200 qm
I Nordteil etwa 19 800 qm
II Südteil
9) 1 Flugzeughalle etwa 3 600 qm
10) 1 Werft- u. Lagerhalle etwa 2 800 qm
11) Lagerhallen für Lkw. Nachschub etwa 1 200 qm
12) Kraftstation etwa 900 qm
13) 1 Verwaltungsgebäude etwa 900 qm
14) 1 Montage Halle etwa 5 100 qm
15) Unterkunftsgebäude etwa 12 000 qm
16) Lager- u. Nebengebäude etwa 3 000 qm
17) Wohnhäuser etwa 1 900 qm
II Südteil etwa 37 200 qm
I Nordteil etwa 19 800 qm
II Südteil etwa 37 200 qm
Bebaute Fläche etwa 57 000 qm
(Schwerpunkte)
Gleisanschluß nicht vorhanden
Erweiterung des Platzes möglich

Right: *The* Luftwaffe *paid an early visit to Biggin Hill on 16th February 1939 and then produced a plan of the airfield. At 6 p.m. on 30th August 1940 a low-level attack with 1,000-pounders smashed Biggin Hill's workshops, the transport yard, stores, barracks, met. office, armoury, W.A.A.F. quarters and a hangar. The power, gas and water mains were severed and all telephone wires north of the camp were cut in three places*

Below: *Veteran German aerial photographers of W.W.I formed the backbone of the* Luftwaffe*'s photo side in the 1930s. This picture was taken by a German reconnaissance plane on 17th May 1918 in the Beaumont area of France and shows ground fortifications. Pilot and photographer are believed to have been Lts. Hollender and Kummerle*



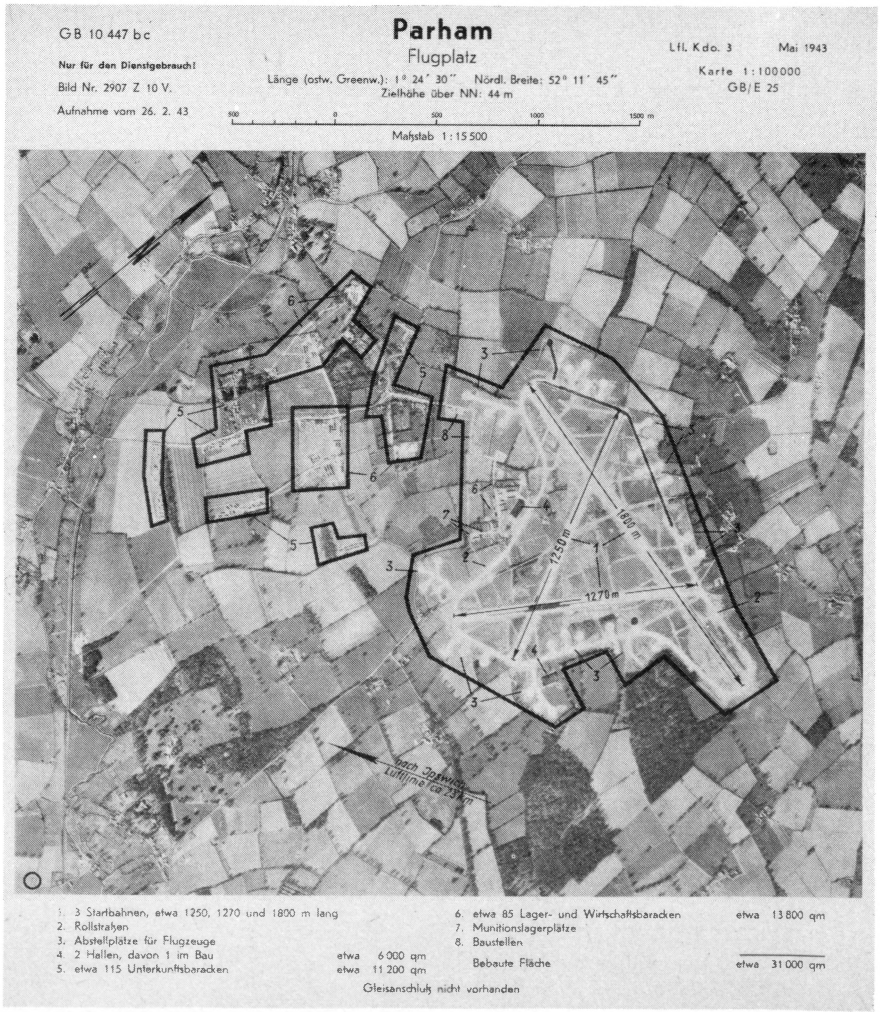
a leader who could make his cause understood at the highest level. Goering, head of the *Luftwaffe*, had little interest in "this reconnaissance business" and still less for PR itself.

So with the Polish (1939), Norwegian (1940) and French (also 1940) campaigns over, the *Luftwaffe*, which had been functioning in close tactical support of the Army, was at its best in PR, if ever it was, during the weeks of the Battle of Britain (10th July–31st October 1940).

Invasion preparations

Preparations for the intended invasion of the U.K. included a careful watch of all naval bases and the Home Fleet and this, of course, was the reason why from October 1939 to April 1940 Scapa Flow and the Firth of Forth attracted so many German PR aircraft. The whole south coast and the Thames Estuary came under their cameras, models were made and defence maps produced,

Above: *Sutton Common emergency airfield in Suffolk, which assisted hundreds of Allied aircraft in trouble, came under the scrutiny of a German photo plane on 31st August 1943. It was there in July 1944 that a radar-equipped Ju 88 landed by mistake at night, the dense pine forests nearby confusing the crew*


GB 10 447 bc
Nur für den Dienstgebrauch!
Bild Nr. 2907 Z 10 V.
Aufnahme vom 26. 2. 43
Parham
Flugplatz
Länge (ostw. Greenw.): 1° 24' 30"
Nördl. Breite: 52° 11' 45"
Zielhöhe über NN: 44 m
Lfl. Kdo. 3 Mai 1943
Karte 1:100000
GB/E 25
Maßstab 1:15500
2500 m
1800 m
1270 m
1. 3 Startbahnen, etwa 1250, 1270 und 1800 m lang
2. Rollstraßen
3. Abstellplätze für Flugzeuge
4. 2 Hallen, davon 1 im Bau etwa 6000 qm
5. etwa 115 Unterkunftsbaracken etwa 11200 qm
6. etwa 85 Lager- und Wirtschaftsbaracken etwa 13800 qm
7. Munitionslagerplätze
8. Baustellen
Bebaute Fläche etwa 31000 qm
Gleisanschluß nicht vorhanden

Right: *While it is known that plans for some U.S.A.A.F. airfields in East Anglia found their way into enemy hands through labourers employed in their construction, the* Luftwaffe *paid increasing attention to new sites in 1942–43 as this excellent vertical shot of Parham (Framlingham), Suffolk, shows. It became the home of the 390th Bomb. Group with Boeing B-17 Fortresses in mid-1943, when this photo was issued*

areas for German bridgeheads were selected and so on. General target photography of the British war effort was pursued, particularly of harbours and airfields. But an attempt to accompany the daylight bomber raids with long-range PR aircraft proved costly and reconnaissance was more profitably carried out after a raid.

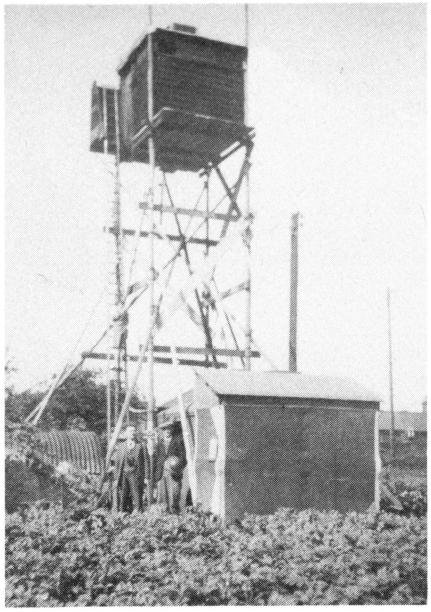
By the end of 1941 long-range PR over the U.K. was becoming a dangerous task in the types of aircraft available (Dornier Do 17, Heinkel He 111 and Junkers Ju 88). In 1942 the eyes of the *Luftwaffe* started to fail in no uncertain way.

The pre-war centralised control producing target folders, such as I acquired from Chièvres, was a department of the *Luftwaffe*. Before the outbreak of W.W.II these folders consisted of a standardised information sheet which retained its original form throughout the war.

Where possible this material was supplemented even before September 1939 by air photographs taken (the 1945 Allied intelligence team noted) "by Do 17 aircraft of a *Gruppe* receiving orders direct from Air Staff and based at Oranienburg, near Berlin, under *Major* (later *Oberst*) Theo Rowehl". These aircraft, flying at their ceiling, "suffered no difficulties or interceptions" and were able to photograph much of France and most of southern England during the latter part of 1938 and the months leading up to the declaration of war in September 1939.

While the total Chièvres hoard, from which my target folders were obtained in the mid-1960s, numbered in all 1,190 individual sets, duplicated many times in some cases, it is interesting to note from the 1945 intelligence report that of the 1,200 target folders examined by the team, 149 of the illustrations (presumably the vertical photographs) were taken before September 1939, mainly in April, May and June.

After the start of the war the staff



Luftwaffe PR . . .

of each *Luftwaffe Luftflotte* (Air Fleet) was given the task of producing its own target material for the areas for which it was responsible. As production was by printing rather than a photographic process, the illustrations lost something of their value for reasons of clarity, and it was said that operational units were not often satisfied with illustrations and requests for original prints were frequent. The Allies, however, felt that the printing quality was very high and equal to anything produced for the R.A.F. and the U.S.A.A.F.

Target categories

The Chièvres hoard, which was roughly assessed in the 1960s, appeared to accommodate about twenty-five target categories with, for example, the prefix GB10 = airfields, GB96 = radar stations and GB73 and 74 = aero-engine and airframe works respectively.

Interestingly, the 1945 intelligence team, who as already said looked at 1,200 sets elsewhere, classified no more than twenty-nine categories but emphasised that this gave only a partial picture of what was produced. What was clear was that the *Luftwaffe* had a definite system for compiling this target material to which it adhered —but with failing eyes—throughout the war. Oddly, there must have been something to be said for the soundness of their target large-scale illustrations for "the format used by the G.A.F. throughout closely resembles that adapted by us in 1942".

The 1945 survey, in addition to finding that 149 U.K. photographs were taken before September 1939, noted the additional time incidence of target photography: 44 photographs taken during September 1939, and 90 in October of that year; the first half of 1940 was very quiet, followed by a big programme from July onwards, with an output of 117, 180 and 119 in August, September and October respectively; output in 1941 was steady, at a low level, totalling 132 for the year; output in 1942 dropped slightly to 123; 1943 had a total of 72, with none at all after August; one illustration was taken in February and April 1944.

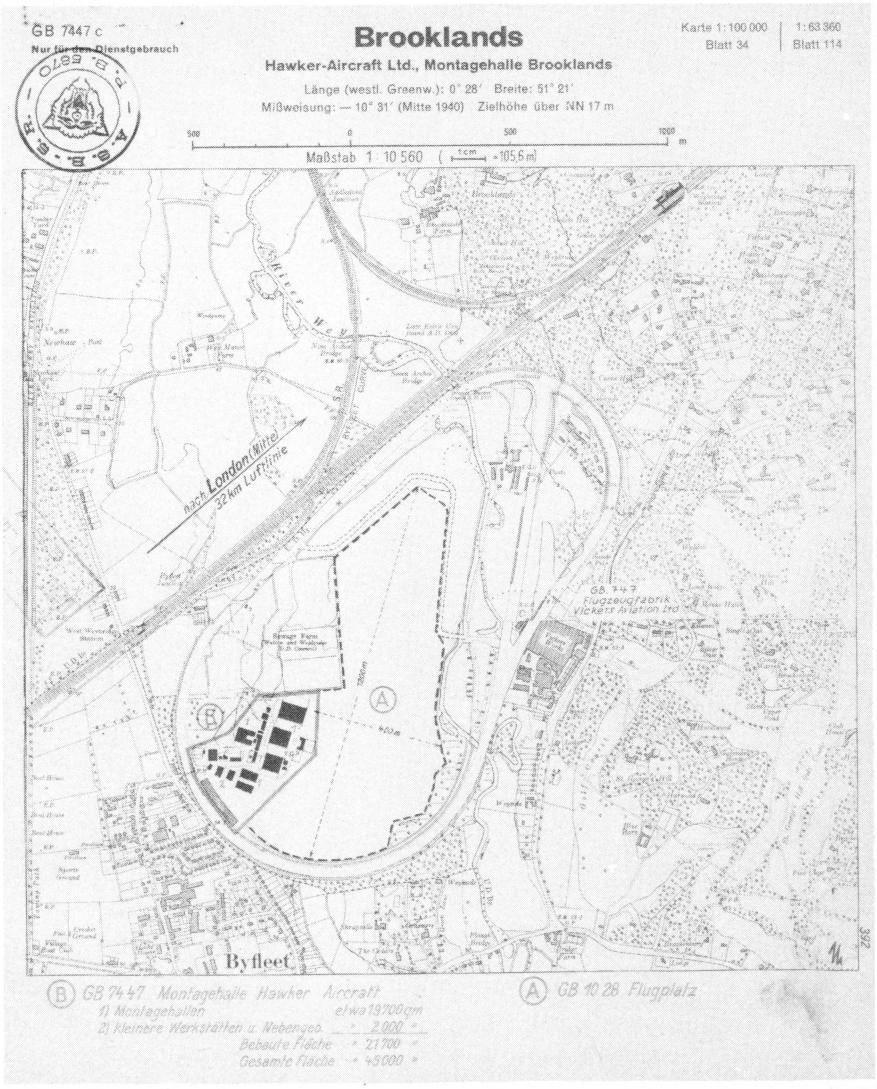
How did the German target folders stand in the way of accuracy of annotation of, for instance, photographs? There was, it seems, a long list of what were considered to be minor errors, but bigger omissions included the fact that underground buildings were missed and that semi-sunken buildings were not described as such. This, the 1945 investigators concluded, pointed to the view that no stereoscopic pairs were used for interpretation.

As for information sheets, which contained vital intelligence in printed form, the peak output among those examined in 1945 (1,200 sets) was in March 1939, with a total of 109 items. The average monthly output for the last four months of that year was about 50. In 1940 the greatest monthly output was from June onwards, with 71, 78 and 88 as the highest monthly figures for September, October and November respectively.

(to be concluded)

Left: *Spotter's post No. 609 on a munitions factory site at Beccles, Suffolk, which logged the passage of many high-flying German reconnaissance aircraft. The post survived a precision low-level attack on 17th November 1940 when it was straddled by bombs intended for a plant making 25-lb. shells (which had been equipped with German tools since 1938)*

Below: *On 4th September 1940 Messerschmitt Bf 110s of* 5./LG 1 *followed the Southern Railway line from Guildford, Surrey, to the Vickers-Armstrongs factory at Brooklands where they did considerable damage. The next day special fighter cover was given to a number of factories, including Hawker's, on the western side of Brooklands. This plan of the Hawker sheds was compiled from a reconnaissance photograph taken on 12th August 1940. The lion stamp in the top left corner was put on by the Belgian Underground when they seized the folders at Chièvres in late 1944*


GB 7447 c
Nur für den Dienstgebrauch
Brooklands
Hawker-Aircraft Ltd., Montagehalle Brooklands
Karte 1:100 000 Blatt 34
1:63 360 Blatt 114
Länge (westl. Greenw.): 0° 28' Breite: 51° 21'
Mißweisung: — 10° 31' (Mitte 1940) Zielhöhe über NN 17 m
Maßstab 1 : 10 560
nach London (Mitte) 32 km Luftlinie
GB 7447 Flugzeugfabrik Vickers Aviation Ltd
Byfleet
B GB 7447 Montagehalle Hawker Aircraft
A GB 10 28 Flugplatz

JARIC is 40

Model-makers of the Central Interpretation Unit completing a scale model of the Kiel harbour complex at Nuneham Park in 1943

THE JOINT Air Reconnaissance Intelligence Centre at R.A.F. Station Brampton, Hunts., celebrated its fortieth anniversary on 11th July 1980.

The original Photographic Interpretation Unit was established in 1940 after Winston Churchill had urged the Air Ministry to form a specialised unit to gain intelligence from aerial photography. Earlier, a civilian aerial survey firm—the Aircraft Operating Company—had interpreted high-altitude photography covertly obtained by the freelance aerial photographer, Sydney Cotton. Cotton's pictures of German naval bases, when interpreted, revealed so much detail that Mr. Churchill insisted that the Aircraft Operating Co., with its specialised equipment, be placed on the R.A.F. establishment.

The Photographic Interpretation Unit became the Central Interpretation Unit when an Army section and a Royal Navy liaison element joined the unit later in 1940. Almost from its inception, the Unit has been organised on a joint-Service basis and has maintained this balance throughout its history. The Central Interpretation Unit outgrew the original premises at Wembley and moved to Danesfield House, beside the River Thames at Medmenham, in May 1941.

Secret war

The Unit played a vital role during the "secret war"; it was directly involved in the planning stages of nearly every operation of the war and in every aspect of intelligence. The peak period of activity was the preparation for Operation "Overlord", the Normandy landings, when the C.I.U. supplied detailed information on terrain, beaches, enemy defences and locations and also prepared landscape models of target areas. The C.I.U. achieved many successes: the identification and subsequent destruction of German radar and electronic systems, the detection of the Nazi V1 and V2 secret weapons, the planning of bombing raids—including the Mohne dams raid—and the subsequent assessment of bombing damage, the selection of dropping and pick-up zones for the traffic of secret agents to and from occupied Europe, monitoring the movements of German naval units, assessing the production capabilities of enemy industries, identifying the first German jet-propelled aircraft, checking enemy transportation systems and providing information for Combined Operations and Commando raids on the coast of Europe.

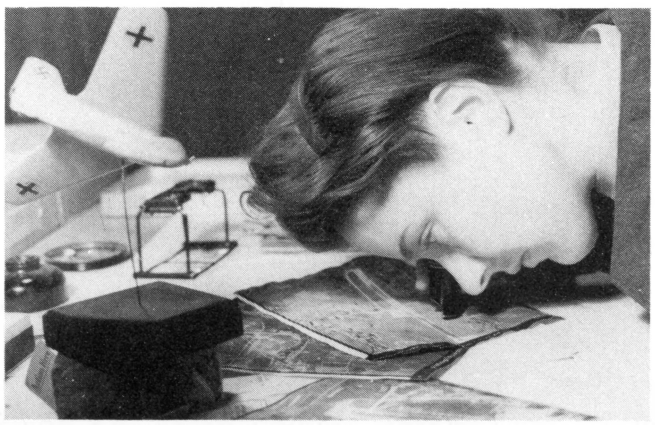
In 1944 the C.I.U. absorbed a large American contingent and thereafter became the Allied Central Interpretation Unit for the remainder of the war. After VE-Day many of the photographic interpreters served in the Far East and the Americans withdrew from the Unit which reverted to its former title.

After the war the strength of the C.I.U. was drastically reduced and it moved from Medmenham to Nuneham Park, Oxfordshire, where it was later renamed the Joint Air Photographic Interpretation Centre. In 1953, as a result of an increase in establishment, the unit was finally renamed the Joint Air Reconnaissance Intelligence Centre and later moved from Nuneham Park to new premises at Brampton in 1957.

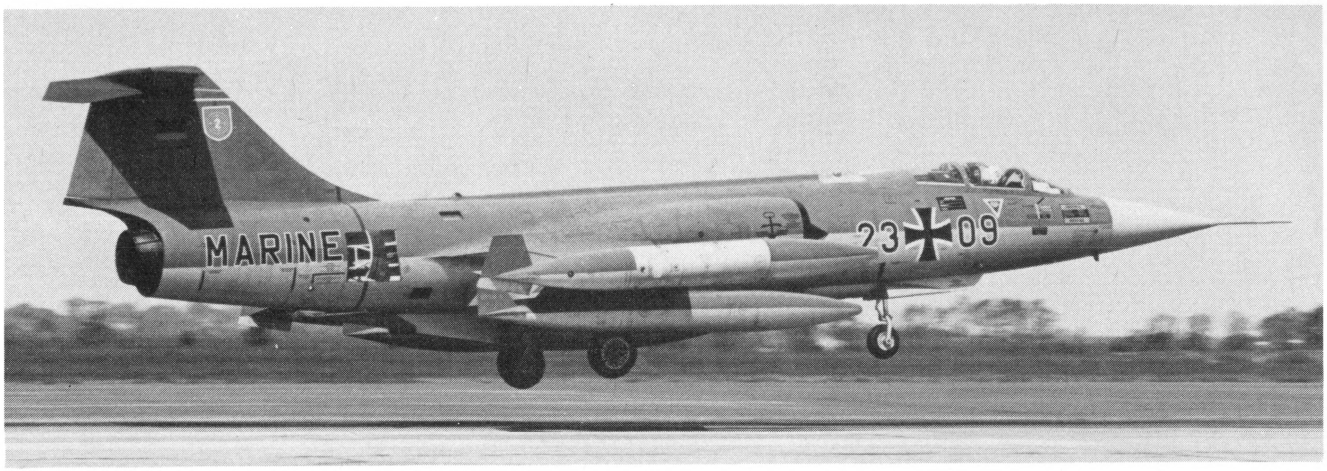
JARIC, although predominantly an R.A.F. unit, continues to reflect its joint-Service role and is staffed by members of the Royal Navy and Women's Royal Naval Service, soldiers of the Royal Engineers, the Intelligence Corps, the Royal Army Ordnance Corps and the Women's Royal Army Corps, the Women's Royal Air Force and civil servants of the scientific and administrative grades. JARIC, administratively part of R.A.F. Strike Command, not only provides interpreted aerial imagery for targeting purposes but also for town and country planning, pollution studies, accident and disaster investigations and has even assisted in the search for the Loch Ness monster.

After an unbroken period of forty years' existence, JARIC's role remains essentially unchanged and is as important today as it was in 1940—the exploitation and reproduction of aerial imagery for the three Services and various civilian bodies.

Left: *W/Cdr. F. S. (Sydney) Cotton with Air Marshal Sir Arthur Barratt, 1940*



Right: *A W.A.A.F. photographic interpreter, Constance Babington-Smith, measures an aircraft photographed on a German airfield—A.C.I.U., Medmenham, 1944. Note model of the Messerschmitt Me 163 rocket-powered fighter*



Representative of the winning team, West German Navy Lockheed RF-104G Starfighter "23+09" of MFG 2 *is based at Eggebek, venue for this year's competition*

Best Focus

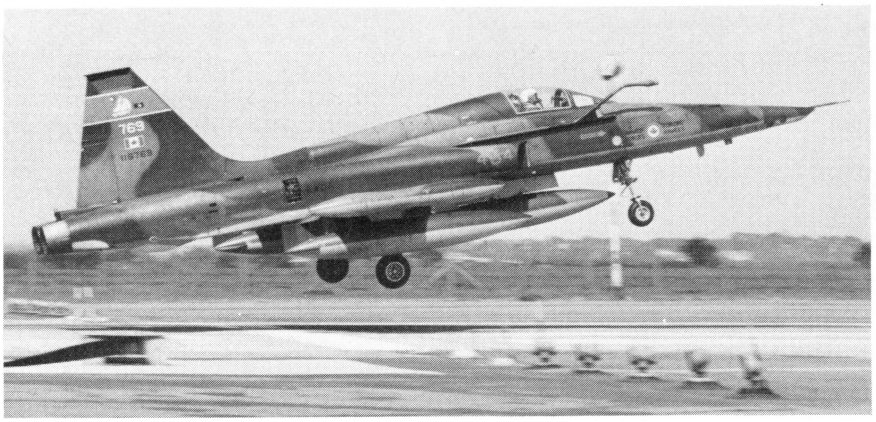
by BEN J. ULLINGS

(Aviation Photos International)

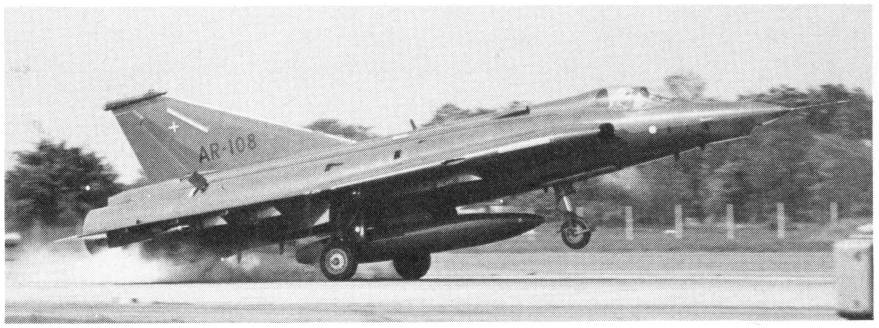
HOSTS FOR this year's "Best Focus" tactical reconnaissance competition —a biennial event organised by Allied Forces Northern Europe (AFNORTH)—were the West German Navy's *Marineflieger Geschwader 2,* flying Lockheed RF-104G Starfighters from Eggebek, near the Danish border. The event was held from 30th May to 7th June, with local jubilation when *MFG 2* proved to be the overall winners.

Other participants included: R.A.F. Jaguar GR.1s of No. 41 Squadron, Coltishall, and Canberra PR.9s of No. 39 Squadron, Wyton; *Luftwaffe* RF-4E Phantoms of *AkG 2,* Leck; four Canadian A.F. CF-5As of No. 434 Squadron, Cold Lake, Alberta; R. Norwegian A.F. RF-5As of No. 336 Squadron, Rygge; R. Danish A.F. SAAB RF-35 Drakens of No. 729 Squadron, Skydstrup; and eight RF-4C Phantoms of the 187th TRG, Alabama ANG, from Montgomery.

Nationalities were mixed during the competition and recce. missions were flown by unusual combinations, such as Starfighter/Jaguar and Draken/Phantom.

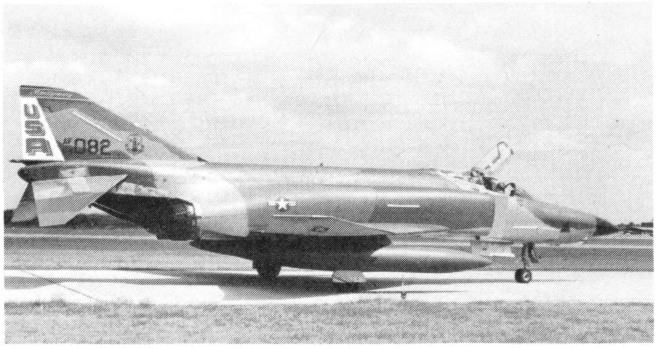


Canadian A.F. Canadair-built Northrop CF-5A 116769 of No. 434 Squadron, over from Cold Lake, bears this unit's "Bluenose" schooner badge on its fin

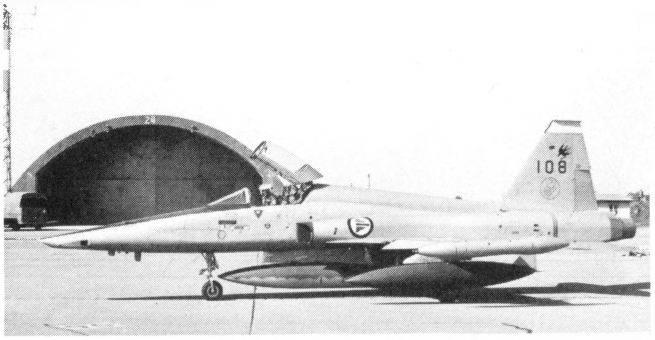


Above: *SAAB RF-35 Draken AR-108 of No. 729 Squadron, R. Danish A.F., from Skydstrup*

One of the Alabama ANG McDonnell Douglas RF-4C Phantoms, 64-082 of the 187th TRG, with colourful "USA" fin marking



As well as its own swallow unit badge, Northrop RF-5A 108 of No. 336 Squadron, R. Norwegian A.F., temporarily wore AkG 51*'s owl*



Aviation Bookshelf

Charles Cain, who was very taken with Geoffrey Jones' book on the Hudson (reviewed on this page), looked through his own files and produced this intriguing picture, not of a Hudson, but of a Lockheed Model 18 Lodestar, ex 42-25607, in French A.F. colours at a base in French North Africa circa end of W.W.II. In the background are a turretless B-25J Mitchell VIP transport, two U.S.A.A.F. B-17 Fortresses (one without turrets), a Dauntless, a Commando, Dakotas, LeO 451s, A-26 Invaders and (to the right) two 1939-vintage Douglas DB-7B3s (Photo: E. C. P. Armées)

Attacker—The Hudson and its Flyers
by Geoffrey Jones (Wm. Kimber, £8.50)
Lockheed airliners have curves where other air transports have straight lines. Take away the enormous and precariously aft-ended dorsal turret and (if you cannot see the extra glazing in the nose) the bomber-reconnaissance Hudson is almost impossible to differentiate from its airliner forebear, the Model 14 Super Electra. As the R.A.F. Coastal Command Hudson, the military Model 214 engaged the enemy on 4th September 1939; and, with hardly any major external reshaping, the developed Model 414s were still in combat squadrons at the end of World War II—a formidable record.

So it is good to see this virtually unsung "attacker" given a place in hardback form for the first time. Author Geoffrey Jones has unearthed some truly amazing stories of the Hudson in front-line action. He has a compelling style reminiscent of Ralph Barker; if one has to carp then it is a friendly criticism in that many of the more than 60 photos will be new to a wider audience and Jones-the-caption-writer does not always know his Hudson Marks from his elbow. But he has unearthed a photo of a No. 13 Squadron, R.A.A.F., Hudson Mk. III with what looks like doubled nose armament of four 0.303-in. Brownings. Praise be!—*C.W.C.*

Naval Air War 1939–1945
by Nathan Miller (Conway Maritime Press, £8.50)
Mr. Miller attempts in this book to survey the whole range of naval air operations by British, American and Japanese carrier-borne aircraft in World War II. He concludes that the new dimension in naval warfare imparted by the flexibility and mobility of shipborne aircraft confers a greater than ever importance on sea power—a lesson that seems not to have been lost on the U.S.S.R.

The main part of the book is naturally devoted to the war in the Pacific between the Fast Carrier Task Forces of the U.S. Navy and the well-equipped but numerically inferior Japanese Naval Air Arm. Of the naval air battles in European waters and the Atlantic, credit is given to the Fleet Air Arm for the work done in support of the Mediterranean Fleet in such actions as Taranto and Matapan and in the Norwegian campaign when the long days of early summer in 1940 deprived the obsolete British naval aircraft of the cover of darkness to hide their vulnerability.

The British carriers were at war for two years before Japan and the United States entered the conflict. During this time the U.S. Navy, with its own experienced observers in the British ships, was able to evaluate at first hand the potential of carrier-borne aircraft and had the industrial capacity to provide not only for its own needs but for those of a hard-pressed ally as well.

The book is well endowed with photographs of ships and aircraft, including many of carriers damaged and on fire from bomb, torpedo and kamikaze attacks. The casualities among ships and aircraft in the Pacific theatre reflect the extraordinary ferocity with which the war at sea was fought. The treacherous attack on Pearl Harbor stimulated the U.S.A. to a single-minded determination to inflict retribution which would not have been so effectively exacted without the flexibility of naval air power until the advent of the nuclear age with the bombs on Hiroshima and Nagasaki.

This book conveys the atmosphere of the air war at sea very well, but the author does not claim to make a comprehensive study of the subject and it is difficult to follow the progress of events without more track charts showing the movements of opposing forces.—*A.S.B.*

Aviation Museums
compiled by Bob Ogden (Jane's, £4.95)
Sub-titled "World Wide Excluding U.S.A.", this is an Airline Publications production but as Macdonald & Jane's (now separate companies) are the distributors you should give their name to your bookseller, and if you are planning to go abroad in the near future you will certainly want a copy.

Each of the entries from Albania (who have a Lockheed T-33) to Zimbabwe (who possess a Tiger Moth, two Vampires, a Texan and a Provost) lists the address of the museum, the admission times (and entry fee in some cases) and the situation to help locate the exhibition more easily. Forty-five U.K. museums are listed, more than one might imagine, while those in Argentina, Finland and Russia, to name but three countries, have very impressive lists of exhibits. Nearer home the French Musée de l'Air has one of the largest collections in the world covering 4½ of the 144 pages in the book. There is a batch of photos of rarer avis, the text, is easy to read, and the editor is to be congratulated on his labours. A useful book.—*G.J.P.*

British Military Aircraft Serials and Markings
(British Aviation Research Group, obtainable from D. J. Allen, BARG Sales Officer, 32 Nash Close, Cove, Farnborough, Hants. GU14 0HL, price £9.95 plus £1.50 postage and packing)
BARG have been responsible in the past for some highly detailed monographs and now have produced their magnum opus, in hard-back, which contains a wealth of information on current British military aircraft. The bulk of the book contains a comprehensive listing of every British military aircraft with serial numbers in the XA100-XZ999 and ZA100 onwards ranges, thus covering the majority of today's and tomorrow's British military aircraft. The format lists the batch details and then there is a line for each individual aircraft, with columns giving the aircraft designation and blank columns for "Sqn/unit", "code", " where and when seen" and "remarks". In this latter column disposal details are given where known.

Thus the buyer can use the book for

a variety of purposes, either treating it as a personal log or using the blank columns for other reference purposes. The book also has a complete run-down on all the R.A.F., F.A.A. and Army flying units with details of aircraft insignia. A full appendix gives similar treatment to aircraft with pre-XA100 serial numbers, covering just those aircraft still listed; other appendices give R.A.F. and F.A.A. instructional airframe listings. There are 300 photographs, many not previously published, and the whole book is beautifully produced.—*J.D.R.R.*

Norwegian Civil Aircraft since 1919
(Midland Counties Publications, softback £3.95, hardback £5.95)
Although uniform externally with the publisher's *British Civil Aircraft 1919–1978,* this volume deals with a far smaller number of aircraft enabling compiler Kay Hagby to provide authoratitive individual potted histories which include (in registration order) type, c/n., previous identity, aircraft names, owners, dates, disposal and subsequent markings.

There has been a long-term need for books of this kind and it is very satisfying to consign a lifetime collection of rough lists to the waste bin and to substitute this neat 120-page volume illustrated by more than 100 photographs covering the first numerical register 1919–1931 (N1 to N50) and then the lettered sequence up to the present day.

Appendices provide peripheral information and include the indexes and cross-references which are now regarded as essential in books of this kind.—*A.J.J.*

Belgian Civil Aircraft since 1920
(Midland Counties Publications, softback £3.95, hardback £5.95)
Identical in layout with the Norwegian volume, this companion work presents equally detailed information on individual aircraft of the first Belgian register 1920–1929 (O-BABA to O-BUIS) as well as the complete register used today, starting with Gipsy Moth OO-AAA registered in July 1930.

Illustrations are numerous and satisfying but there would have been fairer distribution and better balance had a few of the readily available pictures of aircraft with O-B. . . registrations been included to support their sole illustrated representative, SNETA's Breguet O-BROC.—*A.J.J.*

Southern Europe and the Middle East Civil Aircraft Registers 1980
(Air-Britain, members £3.00, non-members £4.50)
Air-Britain registers are such a basic necessity of life that they need little introduction. This new wide-back edition takes you from Portugal in the west, through all the countries along the north side of the Mediterranean and through Turkey to Iran; despite its title it then dips south and embraces the whole of the Near East down to the Yemen.

Its 120 pages feature current registers of the larger countries but complete ones are given for the majority of the smaller states. They thus contain details of every aircraft that have ever been registered in these territories and are therefore of outstanding historical interest. There are many old and valuable items among the 66 photographs and it is a pity that many have been rendered murky by the type of reproduction.—*A.J.J.*

1980 Registers of Germany
(Air-Britain, members £4.00, non-members £6.00)
This is a companion wide-spine monograph which, in 162 pages and 51 photos, features the current registers of East and West Germany with all the vital detail in standard Air-Britain layout of type, c/n., previous identities, dates, owners and bases. Even the East German section is now based on official material.

For newcomers, the German weigh-class system of registrations is lucidly explained and the volume is rounded off by tables of resident non-German aircraft and of balloons, four of which are ex-British.—*A.J.J.*

Wings of Freedom—Twelve Battle of Britain Pilots
by Norman Franks (Wm. Kimber, £7.95)
Here are illustrated accounts of a dozen Battle of Britain fighter pilots, some better known than others: Victor Beamish, "Cowboy" Blatchford, David Crook, John Dundas, Richard Hillary, Paterson Hughes, "Sandy" Lane, Eric Marrs, "Willie" Rhodes-Moorhouse, Michael Robinson, Peter Walley and Nigel Weir. The author explains his selection reasonably enough; his knowledge of their individual histories was enough to make him want to know more and to pass on this new understanding of the sort of flying men who helped to write the history of Britain under attack in the summer of 1940.—*C.W.C.*

Royal Air Force Aircraft R1000 to R9999
(Air-Britain, members £2.50, non-members £3.75)
In the same format as the previous volumes covering the K, L, N and P series, this fifth volume covers deliveries of the R series between July 1939 and January 1943. Early serials were allotted to types such as the Wellington, Beaufighter and Lysander, some went to a smattering of experimentals and to civil types in disguise such as the D.H. Flamingo, Lockheed 12A and Hendy Heck, while the later allocations were for production batches of types such as the Typhoon which entered service 1941–1942.

Through clear presentation the compilers have found space, despite their Herculean task, for all the units on which each aircraft served, dates and places of disposal through enemy action, crashes or old age, and for the subsequent identities of any survivors.—*A.J.J.*

Gloster Javelin Marks 7 to 9R
by Roger Lindsay (Obtainable from specialist bookshops or Roger Lindsay at 1 Chantry Close, Norton, Stockton-on-Tees, Cleveland, TS20 1EN, price £2.70 plus 26p postage and packing)
In 1977 Roger Lindsay produced a monograph on the first six marks of the Gloster Javelin, that most chunky-looking of all the 1950s fighters and this monograph, produced in an identical format, completes the story, covering those versions fitted with the uprated Sapphire engines and with air-to-air missiles. Details are given of the aircraft's development and service with each R.A.F. unit, the whole copiously illustrated with photographs. There are also line drawings by Alfie Alderson and individual histories of each aircraft, thus giving a complete run-down on the Javelin in an economical space.—*J.D.R.R.*

Airshows 1979
by David Sargent (Midland Counties Publications, £2.45)
Here, for the lazy reggie-spotter, is a complete run-down on every aviation event that took place in the U.K. and Western Europe during 1979. No longer do we go round with notebook and biro noting down every aircraft we see, rejoicing over the rare but frustrated by the same old things again. We can just sit back and wait until the middle of next year and have our log sent to us, prepacked, recorded and corrected. Can this be the ultimate in reggie-spotting?

Seriously, it is a remarkable publication listing 237 happenings in the U.K. alone with full lists of aircraft appearing. It is well illustrated with photographs of aircraft at these events and tastefully produced. However, one is forced to wonder how much longer—in view of that dwindling commodity, aviation fuel—spectators will be allowed to "goof" at aeroplanes in such quantity.—*J.D.R.R.*

Wings of the Navy
by Captain Eric Brown (Jane's, £8.95)
Edited by William Green and Gordon Swanborough from a series of articles which appeared originally in *Aviation International,* what we have here are first-hand experiences of flying sixteen Allied carrier aircraft of World War II: Swordfish, Chesapeake, Skua, Roc, Wildcat, Dauntless, Albacore, Fulmar, Corsair, Helldiver, Barracuda, Sea Hur-

(continued on page 452)

Peter Vann's photos of the prototype Republic XF-84H turboprop fighter, 51-17059, preserved at Bakersfield Airport. Engine was a 5,850-s.h.p. Allison XT40-A-1

Your Questions Answered . . .

. . . by AIR-BRITAIN via its over 150 Information Specialists and Aviation Research Groups. Will readers please confine their enquiries to one specific subject, and note that information cannot be supplied separately by post. Unidentified rare photos welcomed for comment.—Ed.

Republic XF-84H

Q: *Please identify the aircraft shown in the enclosed photos, taken at Bakersfield Airport, California.—Peter J. Vann, Gillingham, Dorset.*

A: This is the only surviving Republic XF-84H, a type developed in 1951 by the Republic Aviation Corp. as a turboprop-powered fighter and attack aircraft with a long range at low altitude and a long loiter time over enemy target areas.

The XF-84H was powered by a single Allison XT40-A-1 turboprop developing 5,850 e.s.h.p. and driving an Aeroproducts three-bladed propeller. Although derived from the Republic F-84F, it bore little resemblance to or connection with the jet F-84F, and was in fact built from the outset for a specialised task. The only parts similar to the F-84F were the wing sections and canopy. The one piece slab-type tailplane was mounted on top of the fin and rudder in order to be clear of the propeller wash. A shark fin was installed just behind the cockpit to help counteract the torque of the large propeller.

Four XF-84Hs were originally ordered, three for the U.S.A.F. and one for the U.S. Navy, but only two (designated XF-84H-RE) were completed and flown—both for the Air Force, with serial numbers 51-17059 and 51-17060. The third prototype, construction of which was begun, was to have tested a twin-propeller system consisting of two sets of three-bladed propellers, both rotating in the *same* direction (although contra-rotating propellers were in fact considered). Although the fourth aircraft was originally earmarked for Navy carrier trials, the U.S.N. in fact never had anything to do with either of the aircraft completed, and presumably lost interest after the testing of these aircraft.

The first prototype XF-84H (117059), after undergoing lengthy trials at Edwards AFB, made its first flight on 22nd July 1955, piloted by Republic test pilot Hank Beaird. Several serious problems with the design soon became apparent: the centre of gravity was too far forward, causing handling problems at low speeds; the nosewheel steering system was very tricky to operate; the gearbox and drive shafts connecting the propeller to the engine overheated and did not function properly at times; and the aircraft was reported to be the noisiest ever produced, with the tips of the propeller blades turning at supersonic speeds and causing a high-pitched screech. Testing continued but after twelve test flights had been completed, the second aircraft (117060) made the last XF-84H flight on 9th October 1956, piloted by another Republic test pilot, Ian Hendrix. The project was then cancelled.

Aircraft '060 was scrapped, but '059 was donated to the Kern County Historical Society and subsequently preserved at Bakersfield Airport, California, where, thanks to the Airport Manager, it is still kept in very good condition.—*Peter J. Marson, Leader, U.S. Aviation Research Group.*

Millet-Lagarde ML-10

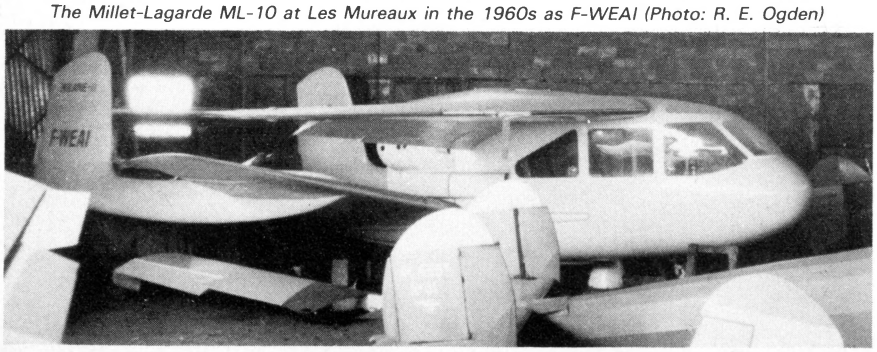
Q. *Please publish details and a picture of the Millet-Lagarde ML-10.—W. K. van Tilborg, Hoogvliet, Holland.*

A: The Millet-Lagarde ML-10 was one of the most unusual light aircraft built in France after the war. Designed by Jacques Lagarde, the prototype was intended to test a "fool-proof" formula for subsequent commercial designs.

The ML-10 had heavily staggered cantilever biplane wings with the control surfaces on the upper (front) wing. Twin booms were mounted on the lower wing and these carried a large fin/elevator assembly (the aircraft had no rudder). The ML-10 had a fixed tricycle undercarriage and was powered by a 180-h.p. Regnier six-cylinder pusher engine behind the cabin. The cabin itself had room for a pilot in the extreme nose and three passengers on a rear bench seat.

The prototype, F-WEPK, was based at Cormeilles-en-Vexin and first flew on 28th October 1949. It was subsequently withdrawn from use but in the mid-1960s an attempt at restoration was made and the aircraft lay at Les Mureaux for some while with the registration F-WEAI and the title "Milane II". Its current status is unknown.—*R. W. Simpson, Light and Homebuilt Aircraft Specialist, French Aviation Research Group.*

The Millet-Lagarde ML-10 at Les Mureaux in the 1960s as F-WEAI (Photo: R. E. Ogden)



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Left: *Redcoat Air Cargo's Canadair CL-44D-4 "James", formerly G-AZKJ and now suitably re-registered G-BRED, photographed at Stansted 7/9 (George Pennick).* Right: *The Heathrow-based Falcon 20, G-BGOP, operated by the Fan Jet Falcon Centre on behalf of Datsun (U.K.) Ltd., during a stop at Yeadon 1/9 (Colin Addison)*

Register Review

by A. J. JACKSON

United Kingdom

Registration	*Type*	*c/n.*	*Previous Identity*	*Remarks*
G-AZRU	Jet Ranger 206B	8304		Restored to Heliwork Ltd.
G-BGDP to G-BGDU	Boeing 737-236	21804 to 21807		British Airways Board
G-BGJI	Boeing 737-236	22030		British Airtours Ltd., Gatwick
G-BGJJ	Boeing 737-236	22031		
G-BHRK	Colt Saucepan balloon	062		Colt Balloons Ltd., Oswestry
G-BHSS	Pitts S-1C Special	C1461M	N1704	T. R. and E. A. Wiltshire
G-BHWK	M.S.880B Rallye	870	F-BONK	Tredair Ltd.
G-BHXS	Jodel D120	133	F-BIXS	K. A. Fox and J. Smith
G-BHZC	Commander 690C	11602	N840R	Rialto Builders Ltd.
G-BHZK	AA-5B Tiger	0743	N28670	L. V. Henderson, London
G-BHZL	AA-5A Cheetah	0542	N26357	
G-BHZM	Jodel DR1050	264	F-BJYZ	P. B. Kingsford, Ashford
G-BIAY	AA-5 Traveler	0423	OY-GAD	Lorien Textiles (UK) Ltd.
G-BIBE	Bandeirante 110-P1	288		Loganair Ltd., Glasgow
G-BIBM	AA-5A Cheetah	0771	N26857	Cabair Ltd., Elstree
G-BIBT	AA-5B Tiger	1047	N4518V	Tradecliff Ltd., Wokingham
G-BIBY	F33A Bonanza	CE-906		Carl Peterson Ltd., Hurn
G-BICB	Rotec Rallye 2B	1176-0		J. D. Lye and A. P. Jones, Avon
G-BICC	Vulture AX-3 balloon	CC.1		C. P. Clitheroe, Timperley
G-BICD	Auster 5	735	F-BFXH	J. A. S. Baldry and partners, St. Ives, Cambs.
G-BICE	AT-6C Harvard IIA	88-9755		C. M. L. Edwards, Ipswich
G-BICF	GA-7 Cougar	107		
G-BIGG	Cessna F152	F.1796		Rogers Aviation Ltd.
G-BICH	WMB2 Windstreaker	11		D. P. Moth, Bracknell, Berks
G-BICJ	Sonerai II	726		J. R. S. Heaton, Keighley
G-BICK	HS748 Series 2A	1782		British Aerospace, Woodford
G-BICM	Colt 56A	095		T. A. R. and S. Turner, Fordingbridge, Hants.
G-BICN	Falco F.8L	PH001-2		R. J. Barber, Beccles, Suffolk
G-BICO	Neale Mitefly model hot air balloon	NM.001		T. Neale, Warlingham, Surrey
G-BICR	Jodel D120A	135	F-BIXR	S. W. Hall and partners, t/a Beehive Flying Group, Redhill; d/d Hannington via Biggin 10/9
G-BICT	Evans VP-1	10455		A. C. Combe, Broadway, Worcs. and D. L. Tribe, Alcester
G-BICU	Cameron V-56	680		I. S. Clarke, Newcastle on Tyne
G-BICY	Apache 160	23-1640	OO-AOL	Allen Technical Services Ltd.
G-BICZ	Simpson Hill Hummer	JS.1		J. Simpson, Bishopbrigg, Glasgow
G-BIDA	Rallye 100ST	3041		Oakley Motor Units Ltd., Shoreham
G-BIDB	BAe 167 Strikemaster	367		British Aerospace Aircraft Group
G-BIDD	Evans VP-1	10167		I. D. Daniels, Herne Bay, Kent
G-BIDE	Emeraude 301A	10566		D. Elliott, Hyde, Cheshire
G-BIDF	Cessna F172P	F.2045		Rogers Aviation Ltd., Cranfield
G-BIDG	Jodel D150A	08	F-BLDG	D. R. Gray, Wilmslow, Cheshire
G-BIDH	Cessna 152	80546	N25234	G. Lewis, Hiswall, Merseyside
G-BIDJ	Super Cub 150	18-6007	PH-MAY	Light Aircraft Engineering Ltd., d/d to Elstree via Southend 12/9
G-BIDK	Super Cub 150	18-6591	PH-MAI	
G-BIDM	Cessna F172H	F.0622	SE-FMM	D. H. McDonald
G-BIDN	Sea Prince T.Mk.1		WF133	T. Warren
G-BIDT	Cameron A-375	686		Ballooning Endeavours Ltd.
G-BIDV	Colt AX-2	034		International Distillers Ltd.
G-BIDW	Sopwith 1½ strutter replica	WA.5		V. H. Bellamy, St. Just, Cornwall
G-BIDX	Jodel D112	876	F-BIQY	H. N. Nuttall and partners
G-BIDY	WMB2 Windstreaker	13		D. M. Campion, Bracknell
G-BIDZ	Colt 21A	94		Hot Air Balloon Ltd.
G-BIEA	Cherokee Arrow 201	28R-18066	N8198V	Express Aviation Services Ltd.
G-BIEB	Agusta-Bell 47G-3B1	1577	HB-XHZ	Autair Ltd., Luton
G-BIEC	Jet Ranger 206B	8308	HB-XDP	
G-BIED	King Air F90	LA-100		Eagle Aircraft Services Ltd., Leavesden
G-BIEE	King Air C90	LS-944		
G-BIEF	Cameron V-77	679		D. S. Bush
G-BIEK	Wallingford WMB4	15		P. B. Street
G-BIEL	Wallingford WMB4	16		A. T. Wallden
G-BIEM	Twin Otter 310	732		Loganair Ltd., Glasgow
G-BIER	Rutan Longeze	00314		N. Mosor
G-BIET	Cameron O-77	674		G. M. Wheatley
G-BIEW	Cessna U206G	05431	N6332U	G. D. Atkinson, Guernsey
G-BIFF	AA-5A Cheetah	0781	N26879	Cabair Ltd., Elstree
G-BIFO	Evans VP-1	10411		P. Raggett, Filton, Bristol
G-BIFU	Short Skyhawk balloon	DKS-001		D. K. Short
G-BIGD	Cameron N-77	676		Cameron Balloons Ltd., Bristol
G-BIGY	Cameron V-65	655		R. J. Plume, t/a Dante Balloon Group

The following out-of-sequence registrations have also been allotted:

G-BPGD	Cameron V-65	658		P. G. Dunnington
G-BRFC	Sea Prince T.Mk.1	71	WP321	D. O. Hughes and partners
G-CLEA	Cherokee 161	28-16081	N30296	Cleaver Marine Ltd., d/d Luton–Staverton 30/8
G-DCOL	Twin Comanche	30-1346	G-BGSU	Airmore International Ltd.
G-DFUB	Boeing 737-2K9	22415		Monarch Airlines Ltd., Luton
G-FUZZ	PA-19 Super Cub	18-1086		G. W. Clive
G-GACA	Sea Prince T.Mk.1	58	WP308	Atlantic and Caribbean Aviation Ltd., d/d Kemble–Staverton 9/9
G-GFLY	Cessna F150K	F.0822	PH-CES	Citation Flying Services Ltd., d/d Deventer–Southend–Humberside 4/9

Tigers: G-APIH which, since 1958, has been in turn D-EMEX, OY-DGJ and N111DH, photographed at Hannington 15/7 after coming out of storage at Little Gransden and being restored to A. J. Detheridge of Linton, Cambs. (Peter Bish). F-BGCS, registered in 1951 ex DF210, at the de Havilland 70th anniversary fly-in at Seven Barrows 10/9 after being flown from Reims via Biggin Hill and Popham 9/9 by owner Serge Maignot who returned by the same route 12/9 (A. J. Jackson)

G-GMSI	TB-9 Tampico	145		Dukeries Aviation Ltd., Netherthorpe
G-HFCI	Cessna F150L	F.0823	PH-CET	Citation Flying Services Ltd. ('CI d/d Deventer–Southend–Humberside 20/9; 'WI same route to Shoreham 4/9)
G-JFWI	Cessna F172N	F.1622	PH-DPA	
G-LION	Super Cub 135	18-8057	PH-KLB	
G-MOGG	Cessna F172N	F.1904	G-BHDY	R. M. W. & B. N. C. Mogg
G-NHVH	Maule M-5-235C	7276C	N5634N	Commercial Go Karts Ltd.
G-NITE	Navajo Chieftain	31-52077	N35594	W.T. Shipping Group (Aviation Division) Ltd.
G-NOEL	Jet Ranger 206B	8435	G-BCWN	N. Edmonds & P. R. McEnhill
G-NWPB	Thunder AX-7/77Z	278		Thunder Balloons Ltd.
G-OBAT	Cessna F152	F.1771		Rogers Aviation Ltd., Cranfield
G-OGDN	Super King Air 200	BB-669		Ogden & Sons Ltd., Otley
G-OJEA	Twin Otter 310	699		Jersey European Airways Ltd.
G-ONAN	HS125 Series 1B	25063	G-BAXG	Shirlstar Container Transport Ltd., London
G-ORAV	Cessna 337D	1088	G-AXGJ	Rogers Aviation Ltd., Cranfield
G-ORMC	Super King Air 200	BB-288	G-BEST	R.M.C. Group Services Ltd., Feltham, Middx.
G-PAGE	Cessna F150L	F.0824	PH-CEJ	Citation Flying Services Ltd., d/d Southend–Humberside 9/6
G-PALS	Enstrom Shark	1191	N5688M	Spooner Aviation Ltd., Shoreham
G-PATT	Cessna 404	0055	G-BHGL	Casair Aviation Services Ltd., d/d Yeadon–Teesside 9/5
G-PENN	AA-5B Tiger	0996	N3756L	Cabair Ltd., Elstree
G-PIPE	Cameron N-56	562		Carreras Rothmans Ltd.
G-POST	Bandeirante	252		Fairflight Charters Ltd., Biggin Hill
G-RAFC	Robin R2112	192		Headcorn Flying School Ltd.
G-REES	Jodel D140	156	F-BMFR	J. D. Rees
G-RHCN	Cessna FR182	F.0054		R. H. C. Neville, Audley End
G-RORO	Cessna 337B	0554	G-AVIX	Walter Edmundson (Haulage) Ltd., Preston

REGISTRATIONS CANCELLED

Registration	*Type*	*Identity*	*Reason*
G-ADRW	Aerostar 601P	0442-167	Sold in the United States
G-ARGC	Cessna 180D	50931	Beyond repair in accident at Cockerham strip, near Lancaster 26/4/80
G-ARLU	Cessna 172B	48502	Withdrawn from use
G-ARSK	Comanche 250	24-2751	Sold in Holland
G-AWAX	Cessna 150D	60153	Cancelled by C.A.A.
G-BATD	Cessna U206F	02014	Beyond repair in forced landing at Shobden 5/4/80
G-BAZD	PA-31 Navajo	31-0915	Sold in Finland
G-BFVF	Bell 212	30698	Sold in Canada
G-BFZR	AA-5B Tiger	0979	Sold in Ireland
G-BGBD	Evans VP-1	10264	Withdrawn from use
G-BGMF	Bell 212	30670	Re-registered in Nigeria
G-BGYX	Hughes 269C	0253	Sold in South Africa
G-BHHL	Westland Lynx	WA.142	Sold in Denmark
G-BHHM	Westland Lynx	WA.134	
G-BHHW	Shorts SD3-30	SH.3045	Sold in the United States
G-BHIE	HS125 Ser. 600B	256048	Sold in Yugoslavia
G-BHJJ	Shorts SD3-30	SH.3046	Sold in the United States
G-BHJM	Shorts SD3-30	SH.3043	To Olympic Airways, Athens
G-BHLB	Sikorsky S-76A	760039	Sold in Canada
G-BHMP	HS125 Ser. 700A	NA0266	Sold in Canada
G-BHPH	Skyvan 3	SH.1968	Sold in Malawi
G-BHPI	Skyvan 3	SH.1971	
G-BHRJ	Sikorsky S-76A	760025	Sold in Canada
G-BHSK	HS125 Ser. 700A	NA0270	
G-BHUY	Twin Otter 310	709	Sold in Canada
G-BHWU	Shorts SD3-30	SH.3050	Sold in Venezuela
G-BHWV	Shorts SD3-30	SH.3051	Sold in the United States
G-BHYJ	Shorts SD3-30	SH.3052	
G-BHYK	Shorts SD3-30	SH.3053	
G-BHYM	Shorts SD3-30	SH.3055	
G-FJGC	Navajo Chieftain	31-52110	Sold in the United States
G-OSKA	Super King Air 200	BB-641	
G-RCAF	T-6 Harvard	88-9723	
G-SURF	T-6 Harvard	51-15063	
G-TIDE	T-6 Harvard	78-6698	
G-BMIN	Navajo Chieftain	31-52145	
G-BNEA	BN-2A Islander	206	
G-BRAC	Britannia 253F	13448	Crashed at Boston, U.S.A. 16/2/80
G-BSUN	Cameron N-56	385	Sold in Belgium
G-BWAL	Navajo Chieftain	31-52093	Sold in Egypt
G-CDBL	Clutton FRED II	123	Withdrawn from use
G-COLT	Aerostar 601P	098	Sold in Canada
G-OAWA	Cessna 421C	0608	Sold in the United States
G-OCPA	PIK 20E-1	20213	Destroyed by motor vehicle at Lasham 15/7/79

PRODUCTION LINE

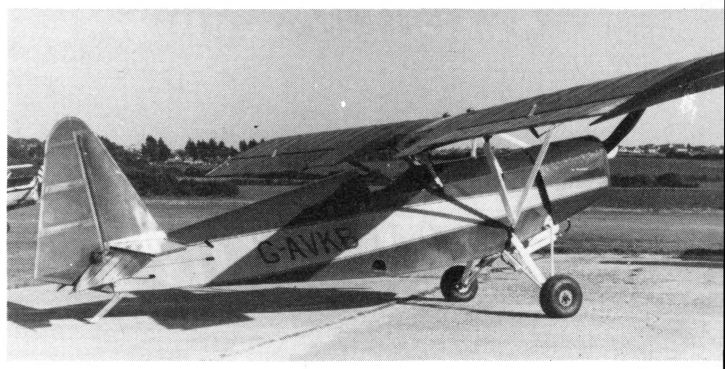
...Boeing 707 (17598) G-AYVG, d/d Castle Donington–Manston 4/8 as N3791G; (17608) G-AYXR, to International Air Lease 6/6 as N37681

...Boeing 737-2T5 (22395–22397) G-BHVG to 'VI, for delivery to Orion Airways 1981

...Cessna 152 (83295) G-BOBI, ex G-BHJD, d/d Staverton–Sherburn 31/8

...HS125 Series 1 (25010) G-ASSM, d/d Castle Donington–Staverton 1/8 as 5N-AMK

...Skyvan 9M-AXN d/d Reykjavik–Prestwick–Belfast 23/9



Dakota 3 G-BHUB in "Ruskin Air Services" livery at Duxford 14/9 and masquerading as G-AGIV for film purposes (marks dating back to 1944 but never allotted) (Paul Jackson); the Sandown-based Brochet MB.50 Pipistrelle G-AVKB photographed there on 31/8 (M. S. Tucker); the transatlantic Super Cub G-BIJB, now glider towing at North Weald, took 8½ hours for the final oceanic leg from Reykjavik to Prestwick (A. J. Jackson); Spencer Flack's Sea Fury FB.11, G-FURY ex WJ244, at the Mildenhall Air Fete 23/8 (Cambridge Aviation Photographers); an 'out of sequence' visitor to Newcastle was Super King Air G-OGDN operated by Ogden and Sons Ltd. of Otley, Yorks. (Ian MacFarlane)

Left: *Garuda Indonesian Airways DC-10-30 PK-GIF at Gatwick after arriving from Jakarta. The airline now operates a regular weekly service into Gatwick on Thursdays (Mike Axe).* Right: *A very rare sight in the U.K., Air Guinee Boeing 707 3X-GAZ taxi-ing out for departure at Stansted on 26/9 after overhaul by Aviation Traders Engineering (George Pennick)*

Airport Movements

Inverness/Dalcross

2/9	PH-CTD	Citation I, c/n. 0157, R.L.S., from Eelde to Shannon
5/9	D-IFOR	King Air 200, c/n. BB-555, ambulance flight, to Freiburg
13/9	146044	C-1A Trader, U.S. Navy, from U.S.S. Nimitz to Kinloss
20/9	236	Westland AH-12A Wasp, 860 Squadron, Royal Netherlands Navy
24/9	OY-AUK	King Air 200, c/n. BB-199, Partnair, from London/Gatwick

Glasgow

31/8	SE-DED	Corvette, c/n. 32; SE-DDE Citation I, c/n. 0063, on 22/9
5/9	02394	F-111F, U.S.A.F. 48 TFW, and Phantom XT866, overshoots
11/9	OY-ASU	King Air 90, c/n. LW-244; OY-ASH, c/n. LJ-306, on 12/9
16/9	N147MA	Mitsubishi MU-2 Marquise, from and to East Midlands
18/9	XC-DUJ	Islander, on delivery flight, left for Reykjavik on 19/9
22/9	HB-VGR	Citation II, c/n. 0080; F-GCQK Rockwell Commander 690

Prestwick

5/9	VP-FAW	Twin Otter, with VP-FAQ, from Biggin Hill to Reykjavik
6/9	N836GA	Learjet 36A, c/n. 027, Gander–Turin; N575SG Gulfstream II
9/9	N26TV	Westwind 1124, delivery, Zurich–Reykjavik; N295WW 10/9
12/9	PT-LBF	Fairchild FH-227, T.A.B.A., from Lydd to Keflavik
13/9	T560	F.27M Troopship, c/n. 10199, Uruguayan Air Force, from Keflavik to Amsterdam. Civil marks CX-BHV also carried
20/9	N716RD	JetStar 2, c/n. 5218, Readers Digest, Brussels–Gander
	VH-BRR	Falcon 20D, c/n. 208, ex HB-VCA, Wards Express, Melbourne
21/9	N847TA	Convair 440, c/n. 464, ex HB-IMU, delivery to U.S.A.

Teesside

29/8	SE-GUU	King Air C90, c/n. LJ-470; LN-PAO King Air 100, Partnair
3/9	OO-WAY	Beech 99, Sabena; OO-LFH Cessna 421C, Abelag, from Brussels
11/9	SE-DEY	Citation I, c/n. 0370; LN-HOT Citation II, c/n. 0076, 23/9
14/9	XR806	VC10, 10 Squadron, Exercise Crusader trooping flight
15/9	OY-BDS	Falcon 20C, c/n. 180, Danfoss; LN-PAC Navajo on 25/9

Newcastle

1/9	N3080	JetStar 6, c/n. 5094, World Carpet Enterprises, from Keflavik to Leeds. It flew Milan–Prestwick–Keflavik 16/9
6/9	N102TV	DC-10-30, c/n. 46801, Transamerica; N101TV on 20/9
	YU-AGI	Boeing 707-351C, J.A.T., ex N369US of Northwest Orient
8/9	I-DCVM	Agusta A.109A, on loan to Barratt while G-HELY on check
11/9	953	C-130H, 335 Squadron Royal Norwegian Air Force, to Oslo
19/9	0125	Falcon 20E, ex LN-FOE, 335 Sqdn., R.Nor.A.F., from Oslo to Aberdeen. Brought King Olav for visit to Newcastle
20/9	SE-DGM	F.28-4000, c/n. 11128, Linjeflyg, Bromma–Gothenburg
23/9	G-BGDR	Boeing 737-236, British Airways, d/d to Heathrow on 19/9

Leeds

1/9	D-COTT	Falcon 20E, c/n. 314, Dornier, from Frankfurt to Le Bourget
8/9	D-IHSV	Citation I, c/n. 0164, Belfast–Kassel, also at Southend 8/9
10/9	N29233	Cessna T.210L, Prestwick–Cardiff, based in Wisconsin
13/9	F-GBGD	Learjet 36, c/n. 016, Euralair, from and to Le Bourget
19/9	OO-JPK	Metroliner, c/n. TC-247, Sabena, from and to Rotterdam

Blackpool

2/9	N25393	Cessna 182P; N1234B Cessna 172 and XT757 Wessex on 12/9
15/9	EI-BHL	King Air E90, c/n. LW-321; EI-BFW King Air 200 on 17/9

Manchester International

1/9	XR808	VC10, 10 Squadron, Operation Crusader trooping flight
2/9	16+01	HFB.320 Hansa, c/n. 1041, Luftwaffe, from and to Cologne
8/9	EI-BBH	Britannia 253, Aer Turas, from Dublin with racehorses
16/9	8R-GFI	Islander, ex G-AZGU, Guyana Air Services, Georgetown
17/9	D-CONY	Learjet 35A, c/n. 195, Contact Air D-CDWN, c/n. 175, 11/9
20/9	MS-019	C-130H, c/n. 4837, Royal Saudi Air Force, on delivery from Montreal, to Milan 21/9. Though in theory a Medevac aircraft its probes and antennae suggest a survey role.
23/9	I-FINR	MS.760 Paris, c/n. 111, Soc. Alinor, Turin, from Cologne

Norwich

31/8	G-HUNT	Hunter Mk. 51; XX739 Jaguar, Coltishall diversion 15/9
4/9	D-IMWT	Aero Commander 690B, c/n. 11488; D-IFSD Cessna 340 23/9
8/9	F-GCMR	F.27 Friendship, c/n. 10324, Air Alsace, for maintenance
	WB530	Devon C.1; XZ598 Sea King; XR443 Sea Heron on 19/9
10/9	G-BHMW	F.27 Friendship, delivery to Air UK; D-IHAA King Air 11/9

Northolt

29/8	NZ7001	C-130H, R.N.Z.A.F.; 952 C-130H, Royal Norwegian A.F.
31/8	MM62113	G.222, Italian Air Force; 71504 Yak-40, Yugoslav A.F.
2/9	MM61955	Piaggio-Douglas PD808TA, c/n. 513; coded 31:55, I.A.F.
5/9	MC280	Harvard, alias G-TEAC, gave joyrides to the visiting Battle of Britain veterans. Also flypast by Spitfire, PS853, Hurricane, PZ865, and the Lancaster, PA474
9/9	240	Super King Air 200, Irish Air Corps; G-MHGI Cessna 414
18/9	17+03	VFW 614, c/n. G.19, Luftwaffe; 16+03 HFB Hansa on 18/9

London/Heathrow

26/8	ET-AHL	Boeing 727-268, Ethiopian Airlines; D-CONU Falcon 20F
30/8	C-GRYO	Boeing 707-351C, Ontario Worldair, for engine change
	N575SF	Gulfstream II, c/n. 221, Standard Oil; HZ-PET, c/n. 139
5/9	N10XY	Boeing 727-76, ex N8043B, Occidental Oil Corporation
6/9	HZ-AHO	TriStar 200, Saudia, new aircraft on delivery flight
	OD-AGZ	Boeing 707-327C, c/n. 19531, ex N7104, Trans Mediterranean
8/9	N4905W	Boeing 737-210C, c/n. 20917, ARAMCO, ex Wien Air Alaska
9/9	A40-PA	DC-8-55F, c/n. 45821, CargOman, Nigeria Airways flight
10/9	N277NS	One-Eleven 401AK, c/n. 057, ex N5017, Norton Simon Inc.
12/9	N44MW	Learjet 35, c/n. 044; N450 Learjet 25B, c/n. 127, on 14/9
14/9	N8043E	Boeing 727-76, Redec; D-CNCP Citation II, c/n. 0105
17/9	N806FT	Boeing 747-249F, Flying Tiger, on Saudia freight flight
	N809F	Falcon 20C, c/n. 35, A. E. Staley Manufacturing Company
18/9	HZ-MPM	Gulfstream II, c/n. 4, Mobil Oil; HZ-MSD Gulfstream II

Southend

3/9	G-BEOZ	Argosy 101, Air Bridge Carriers, freight to Saarbrucken
7/9	OO-FIS	M.S.505, French built Fieseler Storch, Wevelgem–Duxford
20/9	HB-GFX	Volpar Turbo-Beech 18, Berne–Prestwick, en route U.S.A.
25/9	OO-SBS	Boeing 737-229, c/n. 21839, Sobelair, from and to Lille

Manston

21/8	N749L	Fairchild F-27J, c/n. 63, N751L, c/n. 77, 24/8 and N746L on 28/8. All three arrived from Jeddah for open storage
26/8	D-IFNT	Dornier TNT and I-BITE, Aermacchi MB.339K, to Farnborough
3/9	10285	Boeing EC-135H, U.S.A.F. 10 ACCS; 10282, EC-135H, on 15/9
8/9	9Q-CWK	Canadair CL-44, c/n. 11, ex Canadian Armed Forces 106930

Biggin Hill

2/9	4X-AEC	Cherokee 180C, c/n. 28-1968, passed through Southend 24/9
5/9	N56394	Maule M5, visited Blackpool on 26/9; N422PC PA-34 Seneca
15/9	N1UH	Cessna 551 Citation II, c/n. 0017, Martin Sales Inc.
19/9	C-9	F.27M Troopship, c/n. 10159, Royal Netherlands Air Force, with flowers for the Battle of Britain memorial service

Gloucester/Cheltenham (Staverton)

6/9	N266MA	Mitsubishi MU-2 Marquise, from and to Farnborough Show
8/9	PH-JPG	Cessna 310Q, c/n. 0687, Atho B.V., Amsterdam–Hawarden
9/9	D-IMAA	King Air E90, c/n. LW-235, from Dortmund, to Leeds 10/9
13/9	G-LASS	Vari Eze, from Oxford to Biggin Hill, first visit of type
24/9	F-GALL	Beech 58P Baron, c/n. TJ-83, from and to Reims/Champagne

Left: *Belfast G-BEPS at Stansted on 26/9 showing off the new livery adopted by Heavylift Air Cargo following the dropping of "TAC" from the company title (George Pennick).* Right: *Another airline to change its livery is Air Bridge Carriers whose Merchantman G-APES was rolled out at East Midlands on 15/9 in the new red, white and black scheme after a five month rebuild by Fields (Paul Tomlin)*

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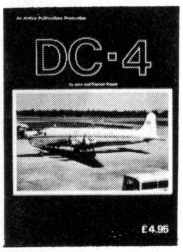

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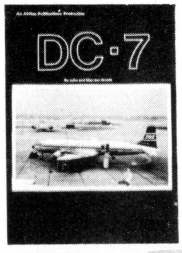

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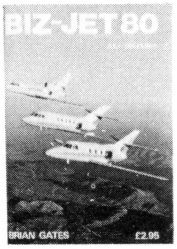

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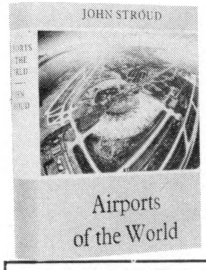

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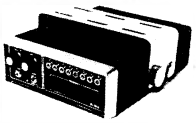

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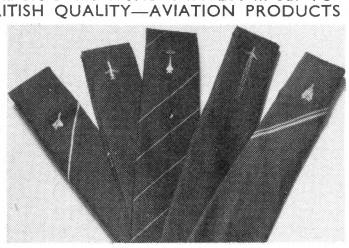

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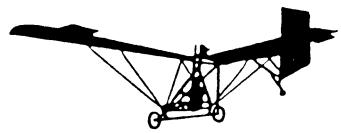

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Aviation Bookshelf . . .

(continued from page 444)

ricane, Avenger, Seafire, Firefly, Firebrand and Hellcat. This list, as can be seen, embraces British and American types and includes biplanes, dive-bombers, fighters, torpedo-bombers, and reconnaissance aircraft. There are copious photographs of each, detailed cutaway drawings of aircraft and cockpits, data boxes and general arrangement drawings, a lot of text (including historical and production details), and some clear printing on nice glossy paper.—*G.J.P.*

Jane's World Sailplanes and Motor Gliders

by Andrew Coates (Jane's, £8.95)

In effect this is an aircraft recognition handbook, with general arrangement drawings instead of the preferred silhouettes, covering more than 180 aircraft (gliders or sailplanes and a few with motors) and each is treated to a basic text and a relatively large photograph, plus the obligatory data table.

The products of about twenty different countries are represented, and some of the craft can only be described as beautiful, so adept are the designers at combining grace with functional ability. They are all here, it seems from the glider one first glimpses as an A.T.C. cadet to the high-aspect ratio wings circling over Bristol in a sunset.—*G.J.P.*

An Illustrated Guide to Bombers of World War II
An Illustrated Guide to German, Italian and Japanese Fighters of World War II

by Bill Gunston (Salamander Books, £2.95 each).

Two books each in what publishers call "Midway editions" (*i.e.*, neither soft nor hard cover, but pliable decorated covers instead) each of 160 pages, featuring over 100 line drawings, about 100 photographs and about 50 colour drawings.

The general arrangement drawings are a bit on the small side, but there is nothing wrong with the 40,000 words of text or the data tables. It was not very sensible, however, to produce the black and white photographs in colour; one grumbles about grey-on-grey, but to have blue-on-blue, brown-on-brown, etc. is absurd and makes each shot fuzzy, destroying the object of its inclusion. True there are a few colour photographs and lots of colourful tone drawings, side-views in the main; but someone ruined them by spreading them across two pages, with splits down the middle.—*G.J.P.*

Airports of the World

by John Stroud (Putnam, £19.95)

Nearly 500 airports in 117 countries are covered by this book which, in Putnam's traditional format, runs to 600-plus pages and is absolutely jam-packed with facts and details. Major treatment is given to 216 airports which handle more than a million passengers annually, essential data are provided for a further 202 in the ¼–1 million passengers per year bracket, an appendix contains brief details of 45 international airports handling 100,000–250,000 passengers annually, and there are entries (some quite detailed) for 25 Soviet and 7 Chinese airports. Runway layouts are shown for 170 of the airports and there are some 250 photographs.

Entries for many of the airports also contain descriptions of their development and history; and among the many nuggets provided by this goldmine of information is the warning to pilots using Indonesia's Jakarta-Kemayoran Airport that: "Small paper kites may be encountered at heights up to 300 ft. on the approaches to runways 08 and 35".

Air Pictorial readers had a preview of *Airports of the World* in the form of a photo feature in the June issue (pages 224–7). They will now find that it is the most comprehensive book of its kind published to date.—*D.D.*

Missing Jaguar

THE ORIGINAL text for the "Farnborough Check List", October issue, page 387, listed two Jaguars but owing to a printer's error the entry for XX979 was printed twice and the other Jaguar lost altogether. The missing item read as follows:

Sepecat Jaguar GR.1 XZ104 (F), 2×5,115-lb. R-R/Turbomeca RT102, 105th production aircraft for R.A.F. in service with No. 2 Squadron as "N", dark-green/dark-grey camouflage overall, R.A.F. insignia, squadron markings on intake, nosewheel door and fin.

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